PROCEEDINGS

of the

American Society

of

Civil Engineers

INSTITUTED 1852

VOL. LII APRIL, 1926 No. 4

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This Society is not responsible for any statement made or opinion expressed in its publications.

Published by the American Society of Civil Engineers at its Headquarters, 33 West Thirty-ninth Street, New York, monthly except June and July. Edited by the Secretary, under the direction of the Committee on Technical Activities and Publications. Reprints from this publication may be made on the condition that the full title of Paper, name of Author, page reference, and date of presentation to the Society, are given.

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Printed in the United States Subscription $8 per annum

SOCIETY AFFAIRS

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AMERICAN SOCIETY OF CIVIL ENGINEERS

PROCEEDINGS

VOL. LII APRIL, 1926 NO. 4

SOCIETY AFFAIRS

Kansas City Meeting

How will modern highway transport affect the railroads? This question, which is becoming more and more important with growing use of improved highways, will be the major topic of discussion at the Spring Meeting in Kansas City, Mo., April 14-16, 1926.

The meeting will be opened on Wednesday, April 14, by Ralph Budd, M. Am. Soc. C. E., with a paper on "The Relation of the Railroads to Modern Highway and Urban Traffic". This subject will be discussed by John V. Hanna, M. Am. Soc. C. E., Chief Engineer, Kansas City Terminal Railway; E. A. Hadley, M. Am. Soc. C. E., Chief Engineer, Missouri Pacific Railroad; Charles F. Loweth, Past-President, Am. Soc. C. E., Chief Engineer, Chicago, Milwaukee and St. Paul Railway, and F. G. Jonah, M. Am. Soc. C. E., Chief Engineer, St. Louis-San Francisco Railway, and others.

At the afternoon session on Wednesday, the important phase of the question, "Urban and Interurban Busses", will be discussed by Britton I. Budd, President, Chicago, North Shore and Milwaukee Railroad Company. Others who will contribute to this topic include Robert P. Woods, M. Am. Soc. C. E., Vice-President and General Manager, Kansas City, Clay County and St. J. Railway; Fred G. Buffe, Manager, Kansas City Railways Company; and B. H. Piepmeier, M. Am. Soc. C. E., Chief Engineer, Missouri State Highway Department.

On the forenoon of Thursday, April 15, the Technical Divisions will hold sessions in their particular fields. Programs have been arranged by the City Planning, Construction, and Sanitary Engineering Divisions.

The City Planning Division program includes two papers, one by Louis R. Ash, M. Am. Soc. C. E., Consulting Engineer, Kansas City, outlining "Some Observations on City Planning". The other paper, by Charles E. Donnelly, Assoc. M. Am. Soc. C. E., Engineer, City Plan Commission of Kansas City, will deal with "Reducing the Cost of the Highway Plan Under the City Plan."

The papers to be discussed before the Construction Division are "Scope, Aims, and Purposes of the Construction Division", by E. J. Mehren, M. Am.

Soc. C. E., Vice-President, McGraw-Hill Company, New York, N. Y., and "Florida from a Construction Engineer's Standpoint", by John P. H. Perry, M. Am. Soc. C. E., Vice-President, Turner Construction Company, New York, N. Y.

The program of the Sanitary Engineers includes a series of papers discussing the Mechanical, Electrical, and Construction Features of the North Side Sewage Treatment Works of the City of Chicago. The general features will be discussed by Messrs. Langdon Pearse, M. Am. Soc. C. E., Chief Engineer, and L. C. Whittemore, M. Am. Soc. C. E., and I. P. Kane, Assoc. M. Am. Soc. C. E., Assistant Engineers of the District. The Mechanical and Electrical Features will be outlined by Messrs. J. T. Hawley, and H. I. Steffa, and the Construction Features by L. B. Barker, M. Am. Soc. C. E., all Engineers of the Sanitary District of Chicago.

In addition to the comprehensive technical program, a number of delightful social functions and sightseeing and inspection trips are to be a part of the program. On Wednesday evening, the engineers will gather at an Informal Dinner, and hear the Hon. Henry J. Allen, ex-Governor of Kansas, speak on "The St. Lawrence Waterway and Other Inland Navigation Projects". On Thursday, April 15, following the Technical Division Meetings, the visiting engineers will be the guests of the Kansas City Engineers Club at luncheon, following which the party will go on a general sightseeing tour of the city. In the evening, a Dinner-Dance will be held in the Roof Garden and Ball Room of the Kansas City Athletic Club.

On Friday, April 16, the entire day will be spent on an automobile trip to various engineering and industrial works about the city. The party will have luncheon at the plant of the Sheffield Steel Corporation, later joining the ladies at the Mission Hills Country Club for tea. Visiting ladies have many features planned for their entertainment, which adds greatly to the attractiveness of the program.

For more complete time schedules and details of the various meetings and trips, members should consult the Official Program which has already been sent to them. The attractiveness of the whole meeting as arranged by the Local Committee is calculated to ensure an excellent attendance.

Reports of Special Committees and of Technical Divisions

In the mass of other materials appearing in the unusually full March *Proceedings*, the reports of various technical activities of the Society might easily have been overlooked. Somewhat more than 160 pages were devoted to the recital of accomplishments for the past year by the Technical Divisions and Special Committees of the Society. In addition, one report—that of the Soils Committee—appears in the present *Proceedings*. The labor thus represented, gratuitously and willingly given by many members, is sufficient in itself to justify the existence of a Technical Society. But this is far from the complete story of Society work; the activities of Standing Committees of the Board of Direction, the many regular meetings of the Society, the papers and discussions published, the work of Society representatives in a variety of endeavors, and of joint committees with other organizations, not to

mention the numerous small details of administration which, although many of them, insignificant in themselves, are, in the aggregate, a large and important mass of necessary work, should be added to the enumeration of the specific technical undertakings. Work of a slightly different nature but very valuable to the Society is that of the Membership Committees of the Local Sections; in addition to these there are, of course, numerous other committees of Local Sections of which definite account can never be made. Somewhere in the great variety of subjects covered, every member should find something to interest him and to help him; and in the sum total of efforts expended and results accomplished, he would find a source of satisfaction and justifiable pride.

March Society Meeting

The regular meeting of the Society on March 3, 1926, was devoted almost exclusively to the consideration of the subject "Pipe Tunnel Under The Gowanus Canal, Brooklyn, N. Y.," as presented by L. S. Stiles, M. Am. Soc. C. E., the author of a paper under that title printed in the January *Proceedings*. Mr. Stiles briefly outlined the economics of the project, the physical handicaps and restrictions, and the method of assembling the steel shell of this tunnel, launching it, putting it in position, and sinking it to its final location. His explanation was greatly aided by the showing of two reels of motion pictures, a number of lantern slides, some large wall charts, and models of the work. Following his talk this paper was the subject of lively and complimentary discussion on the part of the following members: Robert Ridgway, J. C. Meem, J. R. Slattery, F. L. Cranford, C. W. Staniford, H. B. Seaman, T. Kennard Thomson, and John F. O'Rourke. The report of the Tellers appointed to canvass ballots for Amendments to the Constitution was read, as noted elsewhere in this number of *Proceedings*. W. T. Chevalier, M. Am. Soc. C. E., presided. The 160 persons present gave evidence by their attention and the informal discussion following the meeting of their interest in the subject. The meeting adjourned about 10:10 P. M.

Further Data on Rainfall and Run-off

Much has been printed by the Society during the past few years on the subject of rainfall and run-off, but much still remains to be said. Engineers will therefore welcome the latest addition to the all too meager statistics on this important subject—the report of the State Water Supply Commission of Pennsylvania covering hydrographic data particularly for Pennsylvania streams for the year ending September 30, 1921. Information contained in this report was gleaned from all possible sources and covers about 278 stations. Among the data given in whole or in part for the various stations, are included the areas for the drainage stations, monthly and yearly run-off both in total and per square mile, precipitation, and the percentage of precipitation appearing as run-off.

These statistics are none the less important for being several years old; it is hoped that similar figures covering corresponding years, 1922 and 1923, will be available shortly. Engineers interested in these matters should address the

Water Supply Commission of Pennsylvania at Harrisburg, Pa., for copies of the report.

Society Votes to Revise Methods of Expulsion but to Continue Present Membership Requirements

In the vote on amendments to the Constitution, canvassed March 3, 1926, the Society declined to change the membership requirements, but voted to revise the procedure regarding expulsion. The detailed vote on these matters is indicated by the official report of the Tellers as follows:

		A.	B.
Total number of ballots received		3219	3219
Deduct:			
Ballots from members in arrears of dues	3		
" from non-corporate members	6		
" without signature	18		
" with printed signature	1		
Total number not entitled to vote		28	28
Ballots canvassed		3191	3191
Void ballots		9	27
Ballots counted		3182	3164

	Yes.	No.	Necessary to adopt.
Shall the Amendment to Article II.—Membership (Marked "A") be adopted?	2098	1084	2122
Shall the Amendment to Article III.—Admissions and Expulsions (Marked "B") be adopted?	2870	294	2110

WILLIAM J. BOUCHER, *Chairman,*
W. H. BARTON, H. RIDGWAY,
FRANK H. BERGER, F. A. ROSSELL,
CHARLES W. COMSTOCK, R. SPEIRS SAUNDERS,
W. A. CUENOT, HOMER R. SEELY,
JOHN W. DALY, ROYTON F. WHEADON,
CLEMENT KENDALL, HARRY D. WINSOR.
JAMES H. RICHARDSON, *Tellers.*

The proposal regarding Membership (Amendment "A") failed by a few votes to receive the necessary two-thirds affirmative vote for adoption.

A favorable indication of this poll was as regards the relatively large number of returns received; this indicates a substantial and active interest in the general affairs of the Society by the membership at large.

Past-President Endicott Dies

After a notable engineering career culminating in the Presidency of the Society, Mordecai T. Endicott, M. Am. Soc. C. E., died at his home in Washington, D. C., on March 6, 1926. A graduate of Rensselaer Polytechnic Institute, he spent practically his whole career as a civil employee of the Navy

Department on engineering work of magnitude, such as dry docks and Navy Yards. This experience led to his appointment on the Nicaragua Canal Board and, later, on the Isthmian Canal Commission. Finally, he was chosen for three terms as Chief of the Bureau of Yards and Docks, the highest position in the Bureau, attaining the rank of Rear Admiral. He joined the Society in 1877 and for years was very active in its affairs, serving at various times successively as Director, Vice-President, and President (in 1911); since his retirement from official duties he has been less prominent. His many friends among members will mourn his loss and miss his counsel and assistance.

Appointments to Represent Society

Recent appointees to serve the Society in various capacities are as follows:

Board of Trustees, United Engineering Society: Francis Lee Stuart, M. Am. Soc. C. E.

National Conference on Street and Highway Safety, Washington, D. C., March 23-25, 1926: Edwin F. Wendt, M. Am. Soc. C. E.

Joint Research Committee on Yield Point of Structural Steel: Clarence W. Hudson, M. Am. Soc. C. E.

Commission to Develop Washington, D. C.

The matter of the projected thorough study and development of a complete program for the National Capital from the standpoint of City Planning has already been brought to the attention of members in these columns; the importance of this matter and the recent developments in its realization deserve at this time further comment. The Committee appointed by the Board of Direction to follow this matter actively consists of the following members: Morris Knowles, *Chairman;* Harland Bartholomew, Charles B. Ball, A. B. McDaniel, Charles M. Spofford, and James H. Van Wagenen.

These men, after a thorough study of the situation and after conferences with similar groups of other Societies, have collaborated in the formulation of an Act, H. R. 8830, entitled "An Act Providing for a Comprehensive Development of the Park and Playground System of the National Capital". This legislation aims to effect a consistent and co-ordinated plan for the National Capitol and its environs. To this end, the program contemplates a commission to be known as the National Capital Park and Planning Commission, composed of several Government officials and four or six experts in city planning to be appointed by the President and to serve for six years without compensation. Such a Commission, including in its personnel not only Government officials, but outside citizens who are free from all pressure except the ideals of constructive accomplishment, should bring about a plan which will do credit to the Nation.

The matter seems to be one of interest to all patriotic citizens especially to engineers and should receive their active sympathy and support.

Local Sections*

Central Illinois.—February 24, 1926. This was a joint meeting of the Section with the Student Chapter of the University of Illinois, which was held at the Inman Hotel, Champaign, Ill. A committee was appointed to be known as Committee on Award of Junior Prizes, which is to investigate the qualifications of members of the Student Chapter and is to recommend to the Section a candidate for the annual prize. The principal address of the evening was by Past-President C. F. Loweth who spoke on "Railroad Consolidations". The subject was discussed by Professor Slater. Attendance 105.

Cincinnati.—February 8, 1926. Resolutions on the death of James Albert McDonough, M. Am. Soc. C. E., were adopted. A committee was appointed to consider the advisability of expressing to the Board of Direction, opposition to the proposed transfer of the river and harbor work to the proposed Department of Public Works and Public Domain. Mr. F. W. Morrill read a paper on the "Design of Concrete Mixtures", prepared by Mr. Charles T. Kennedy who was unable to be present. Attendance 15.

Colorado.—February 24, 1925. The meeting was held at Denver following a dinner at the Athletic Club. President Coolbaugh, of the Colorado School of Mines, spoke on "Mining Prospects". A general discussion ensued which brought out many points of interest.

Connecticut.—March 6, 1926. A luncheon meeting was held at the Graduates' Club, New Haven, the purpose of which was to discuss the proposed Amendments to the Constitution of the Society. No vote was taken as a Section, but each member present stated his views on the subject. Attendance 25.

Detroit.—February 16, 1926. A meeting was called to discuss the proposed amendments to the Constitution of the Society, particularly those relating to the method of selecting candidates for the offices of President and Vice-President. Delegates were authorized to attend a meeting of Representatives of Local Sections in District No. 7, to be held in Chicago, Ill., on February 24, 1926. The delegates were instructed to present the views of the Section on the proposed amendments and on the question of endorsing candidates for officers of the Society to be elected for 1927. The President of the Section was authorized to appoint an advisory committee to serve with similar committees from other engineering societies which will consider engineering and other problems relating to the welfare of the State of Michigan. Attendance 15.

New York.—February 18, 1926. The Section participated in a Joint Meeting with the Local Sections of the other Founder Societies on "The Effect of the Diesel Electric Locomotive on Heavy Electrification". C. A. Stein, General Manager, Central Railroad of New Jersey, discussed the problem of electrification and the relation of short-haul switching and terminal service to heavy electrification. Hart Cooke, Chief Engineer, McIntosh-Seymour Corporation, spoke on the characteristics of the Diesel electric locomotive and

* For list of Local Section Officers, Rules, etc., see 1926 Year Book, p. 88.

its various applications, and N. W. Storer, Chief Engineer, Westinghouse Electric and Manufacturing Company, discussed the locomotive from the standpoint of the engineer. The subject was further discussed by E. B. Katte, Chief Engineer, Electric Traction, New York Central Railroad, W. B. Potter, Chief Engineer, General Electric Company, Sidney Withington, Electrical Engineer, New York, New Haven and Hartford Railroad, and others. Attendance 875.

Northeastern.—January 30, 1926. Annual Meeting. The meeting was held at the Engineers Club, Boston, Mass. President Charles L. Hammond spoke briefly on the progress and activities of the Section during the year. The following officers were elected: President, Charles W. Sherman; Vice-President, John C. Moses; Secretary, Charles W. Banks. The report of the Committee on a Code of Practice was presented and accepted by the meeting. An address on the work of the Society was given by Secretary Seabury who was a guest of the Section. Attendance 40.

Philadelphia.—January 4, 1926. Afternoon Session. The meeting was devoted to "A Symposium on the Traffic Problem". Howard Strong, Director of Regional Planning Federation, addressed the Section on "The Relation of the Delaware River Approach to Philadelphia Traffic". Mr. Strong was followed by Past-President George S. Webster who spoke on this subject, showing slides of the Delaware River Bridge and results of the study of the traffic problem. Discussion followed. Attendance 90.

Evening Session. John Irving Bright, Member of the American Institute of Architects, addressed the Section on "City Planning as Related to the Traffic Problem of the Delaware River Bridge". Discussion of the subject was participated in by many of those present. After the meeting a dinner was held at the Engineers' Club. The attendance at the meeting was 75 and at the dinner 39.

February 1, 1926. A dinner preceded the meeting. The subject under discussion was "The Program for Transit Development" and "The Design and Construction of the Broad Street Subway by the City of Philadelphia". Henry E. Ehlers, Director, Department of City Transit, gave a history of the plans for rapid transit in the city and an outline of the system that is now being built. Charles H. Stevens, Designing Engineer, Department of City Transit, described the design of the subway system, using slides. Director Paul G. Brown spoke of the methods used by the Keystone State Construction Company in the construction of part of the subway and was followed by Mr. Stevens who described the method carried out on the subway by the Patrick McGovern, Incorporated, also using slides. The attendance at the meeting was 210 and at the dinner 62.

Rochester.—January 7, 1926. Annual Meeting. The following officers were elected: President, J. F. Skinner; First Vice-President, I. E. Matthews; Second Vice-President, W. F. Pond; Secretary-Treasurer, A. H. Metcalfe. The affiliation plan of the Section with the Rochester Engineering Society and the proposed amendments to the Constitution of the Society were discussed. President-elect J. F. Skinner gave a brief address. Attendance 13.

Sacramento.—February 2, 1926. The Rev. Harley H. Gill addressed a Joint Meeting of the Section and the Local Chapter of the American Association of Engineers on "The Elements of Prosperity". Vice-President W. L. Huber was a guest at the meeting. Attendance 39.

February 9, 1926. Mr. Stephen E. Kieffer, of the San Francisco Section, read a paper on the "Proposed Development of the American River at Folsom". Mr. Kieffer proposes to build a high dam to store approximately 250 000 acre-ft. of water to be used for irrigation and for flood control, generating electric power as a by-product. Announcement was made that Mr. H. A. Armstrong, a member of the Section, has been elected a Director of the Peoples' Bank, making two members who are Bank Directors. Attendance 41.

February 23, 1926. Dr. James Thom gave an illustrated talk on "The X-Ray and Radium Treatment". Spencer M. Munson was appointed Assistant Secretary of the Section. Attendance 26.

March 2, 1926. Edward G. Sheibley, Chief Engineer and Superintendent of the Department of Safety, California Industrial Accident Commission, addressed a Joint Meeting of the Section and the Sacramento Chapter of the American Association of Engineers, on the work done by that Commission. Attendance, 32.

St. Louis.—February 25, 1926. After the business of the Section had been transacted, Mr. G. W. Senn, Attorney in charge of condemnation proceedings pertaining to street widening in St. Louis, addressed the meeting and ably explained the necessary legal routine which is causing delay in the matter of street widening and other bond issue projects. Attendance 27.

San Francisco.—December 15, 1925. Ninety members and guests were present at the dinner which preceded the meeting. The following officers were elected: President, B. A. Etcheverry; and Vice-President, W. H. Kirkbride. Robert M. Morton, Chief Engineer, California Highway Commission, addressed the Section on "Engineers and State Highway Construction". Attendance 100.

Utah.—February 4, 1926. Annual Meeting. The meeting which was preceded by a dinner was held at the University Club, Salt Lake City. It was voted to award an annual prize to the Student Chapter at the University of Utah, consisting of initiation fee and first years' dues of membership as a Junior of the Society with a pin suitably engraved. The award is to be made to a member of the Chapter who presents the best graduating thesis on a civil engineering subject. After a lengthy discussion it was decided that the Section endorse action taken by the Engineering Council in the matter of change in personnel of engineers attached to the State Road Commission for purely political reasons. The following officers were elected: President, H. S. Kerr; Secretary-Treasurer, H. S. Kleinschmidt. Attendance 19.

Annual Reports of the Technical Divisions

Annual Report of the Irrigation Division for 1925

During the year 1925 the Irrigation Division of the American Society of Civil Engineers concentrated its activities mainly on the preparation of papers for presentation at the Summer Meeting of the Society in Salt Lake City, Utah, July 8-10, 1925, and on taking an active part in that meeting, which was devoted mainly to the subject of Irrigation. The papers were prepared partly by Committees of the Division and partly by selected speakers. The Executive Committee of the Division assisted in the preparation of the program of the main session of the Salt Lake City Meeting, and prepared the program for the special session of the Division at this meeting.

The Committees of the Division which took active part and prepared the papers for the special session of the Division were: Committee on Duty of Water Studies, S. T. Harding, *Chairman;* Committee on Interstate Water Matters, M. C. Hinderlider, *Chairman;* Committee on Co-Operation Between Federal and State Agencies, Fred C. Scobey, *Chairman.* The Chairman of the Committee on Irrigation Economics, Charles H. West, prepared a discussion on the paper, "Land Settlement of Irrigation Projects,"* by Augustus Griffin, M. Am. Soc. C. E., presented at the main session of the Salt Lake City Meeting.

Of the papers presented at the session of the Division the following were recommended for publication by the Executive Committee of the Division: (1) Report of Duty of Water Committee on Determination of Beneficial Use of Water in the Adjudication of Water Rights, S. T. Harding, *Chairman,* and (2) "Interstate Water Problems and Their Solution," by M. C. Hinderlider, and R. I. Meeker, Members, Am. Soc. C. E. The recommendations of the Executive Committee were approved by the Committee on Publications and Technical Activities of the Society and these papers will appear in *Proceedings.* Through the Executive Committee, William Kelly, M. Am. Soc. C. E., was invited to prepare a paper on "Co-Ordination of Irrigation and Power", which was presented at the main Session of the Salt City Lake Meeting and has been published.†

In previous years the Executive Committees of the Division have considered appointing in addition to the Committees named, which have been functioning, the following: (1) Committee on Drainage of Irrigated Lands; (2) Committee on Relation of Irrigation and Power Demand; and (3) Committee on Land Settlement Problems.

The Executive Committee believes that at least some of the existing Committees should be continued, and that additional Committees should be appointed for the subjects listed and possibly others.

The Committee on Duty of Water has been continuing its work since the Salt Lake City Meeting and has a large field to cover.

* *Proceedings,* Am. Soc. C. E., March, 1926, Papers and Discussions, p. 416.
† *Proceedings,* Am. Soc. C. E., December, 1925, Papers and Discussions, p. 1946.

The Executive Committee has recommended in the past that the active participation in the meetings of the Society should be largely confined to the meetings held in the Western States where large numbers of the Division can best attend. The Summer Meetings in Seattle, Wash., in 1926 and in Denver, Colo., in 1927, give good opportunities for the Division to present attractive programs which will draw a large attendance from its membership.

The newly elected members of the Executive Committee of the Irrigation Division for 1926 are: Joseph Jacobs, Seattle, Wash., *Chairman*, Glenn L. Parker, Tacoma, Wash., *Secretary*, Frank C. Emerson, Cheyenne, Wyo., Ralph I. Meeker, Denver, Colo., and S. T. Harding, Berkeley, Calif.

A. KEMPKEY, *Chairman*, Irrigation Division,
B. A. ETCHEVERRY, *Secretary*.

Progress Reports of Committees of Technical Divisions

Progress Report of Special Committee of the Sanitary Engineering Division on Co-operation with the New Jersey Sewage Experiment Station*

TO THE MEMBERS OF THE SANITARY ENGINEERING DIVISION,
AMERICAN SOCIETY OF CIVIL ENGINEERS:

Summary of Results from July 1, 1924, to June 30, 1925.—The field studies this year have been continued on the joint sewage disposal plant at Plainfield, North Plainfield, and Dunellen, N. J., and a beginning made to compare in a general way some other sewage disposal plants. Some co-operative studies have been made with superintendents and chemists of different plants in the United States regarding the use of a *pH*-index for sludge digestion. The laboratory experiments have been concentrated on studies regarding the digestion of protein material and fats present in sewage.

Chemical Studies.—As a practical means of diagnosing the course of digestion in Imhoff tank digestion chambers some simple determinations are needed, which, correlated with intensive tests, might reveal approaching trouble and suggest a remedy. The colorimetric determination of hydrogen-ion concentration and the determination of CO_2 in gases evolved during the processes of digestion seemed most promising for the purpose.

The carbon dioxide content of gas from the tanks fluctuated more or less regularly. The oscillations themselves are independent of temperature, but the general tendency of the curves constructed seems opposite the trend of

* Presented to the meeting of the Sanitary Engineering Division, January 21, 1926.

the temperature curve recorded for a tank which was digesting poorly. The oscillations in general are directly correlated with the resting and operating periods of the tank. Shortly after the tank is put out of operation the CO_2 content of the gas decreases with a subsequent increase when the tank is placed in operation again. The addition of fresh solids to the partly digested material causes an increase in CO_2 production.

The relation between ammonia and the CO_2 content of the liquid material between the scum and the sludge is direct and very striking. The NH_3 and CO_2 produced, combine to form ammonium carbonates which formation tends to make the tank content more alkaline. This alkalinity, however, is offset by the organic acids and acid salts formed from protein material and especially from carbo-hydrates material. Quantities of CO_2 in solution are neutralized by the NH_3, while part of the CO_2 escapes as a gas, and the total titrable acidity remaining in a continuously operating tank is practically constant.

Since the bacterial groups are constantly fluctuating with changes of operation, the fluctuations of ammonia, CO_2, carbonates, and organic acids result in certain readings of *pH* values. The hydrogen-ion concentration increases rapidly when acid production increases, and it seems clear that the regular determination of hydrogen-ion concentration of the liquid gives a real indication of tank behavior. If it is indicated by this method that larger quantities of acids and acid salts are produced than can be neutralized a correction by the addition of chemicals will be beneficial.

Temperature readings made by a self-recording thermograph at a depth of 10 ft. in the tank shows that seasonal fluctuations are from 50° Fahr. in midwinter to 70 to 75° in midsummer. The changes in temperatures are very gradual and follow the changes in air temperature.

From a study on a tank cleaned, altered, and put into operation anew, it became evident that definite relation must be maintained between the incoming fresh solids and the ripe sludge present, if digestion is to go forward at a satisfactory rate.

A study was conducted on the appearance of the more unusual Imhoff tank gases. The results show that if hydrogen is formed in the digestion processes it is not found in the gases evolving from the tanks. Hydrogen brought and left in contact with sludge disappears readily. Practically no hydrogen is absorbed when the sludge is sterilized by heat. The hydrogen-ion concentration of the sludge does not change when hydrogen is absorbed by the sludge.

Hydrogen sulfide was found in gases from only one tank which was recently put into operation anew. Other light gases not yet identified may be present in Imhoff tank gases.

Zoological Results.—The correlation between occurrence and numbers of *Protozoa,* bacteria, and chemical end-products has this year been unusually fruitful. It seems that the *Protozoa* play a much larger rôle in the behavior of tanks than was formally supposed. As a matter of fact only a few scattered observations on *Protozoa* as indices of pollution are published, whereas

the possible rôle these animals are playing in sewage disposal is—perhaps with the exception of the activated sludge process—a matter of speculation. This year it has been definitely shown that some direct relation exists between the numbers of *Protozoa* present and the behavior of a tank. Every time a tank foamed the numbers of animals increased enormously.

When the work was started it was assumed that the *Protozoa* were mainly bacterial feeders, and this assumption was strengthened when it was found that as a rule they increased shortly after an increase in bacterial numbers. However, studies show that the animal forms present in largest numbers are saprophytic, that is, they attack the sewage directly or live on material released in the process of decomposition. Very few of the *Protozoa* subsist on bacteria. It is not likely that *Protozoa* function mainly through feeding on bacteria, nor by the attack of sewage direct, but live more on the products released by bacterial action. If sewage in anærobic tanks was attacked by the animals they should always be present in approximately the same numbers, and would retain their abundance continuously as long as fresh sewage entered. It seems, therefore, that they are possibly a great help in the destruction of partly decomposed material, but that under certain circumstances certain prevalent bacteria produce substances which form a favorable medium for the animals, thereby stimulating their growth and reproduction to such an extent that their presence becomes detrimental to efficient and rapid digestion.

Bacteriological Results.—A tank which was cleaned and put into operation again, showed a rapid increase of bacteria during the first month of operation. At this time a sudden decrease occurred followed by an increase and a gradual decline of bacterial numbers. Albumen digesters and H_2S producers remained fairly constant during the first six weeks and rose abruptly after two months, followed by a decline and rise again. There was a direct relation between albumen digesters and H_2S producers, the sharp drop in bacteria occurring with a decrease in CO_2 content of the gases produced.

The bacterial numbers remained fairly constant for several months in a tank used for storage of partly digested solids. Albumen digesters and H_2S producers fluctuated in this tank. These fluctuations coincided with sharp rises in temperature.

A comparison between bacteria found in a tank which had been in continuous operation (Tank 3) and the tank put in operation anew (Tank 5) shows that the day when Tank 5 was started the liquid contained 1 400 000 bacteria per cu. cm., as estimated by agar-plate counts at 20° cent. The liquid in Tank 3 on that date contained 5 500 000 bacteria per cu. cm., while the influent and effluent contained 1 400 000 and 1 700 000, respectively. Thus, although seeded with sludge, the new tank liquid was not more concentrated than the raw sewage. In 3 days, 6 500 000 bacteria per cu. cm. were observed, and after 16 days not less than 37 000 000 were recorded. After 25 days, Tank 3 liquid contained 42 000 000 bacteria per cu. cm. and Tank 5 about 20 000 000. Thus, it took less than 4 weeks for the population in the new tank to become as dense (in the liquid part) as the population of the old tank.

Fresh Solids Digestion.—The fresh solids collected at the sewage disposal plant are kept at a temperature of about 20° cent. in the laboratory. Chemical data showed distinctly that the protein material is attacked by a group of organisms which made it ready for the attack of other definite groups. This was borne out also by the figures obtained on bacterial contents.

Gas production from the fresh solids decreased after 7 days from 830 cu. cm. per day to only 45 cu. cm. per day after 16 weeks; from then on, the quantities increased with accelerated rapidity. Gas production at the beginning was caused by the decomposition of products easily attacked by the organisms. It took at least 16 weeks before the flora was sufficiently changed and built up anew before the more difficult digestible materials were broken down. After 7 months the solids decreased 50%, but when small quantities of air were admitted, the reduction of fresh solids was only 25 per cent.

Addition of Fresh Solids to Ripe Sludge.—Daily additions of different quantities of fresh solids to certain quantities of ripe sludge show that bacterial numbers increase, but fluctuate considerably. There seems to be a rhythmic increase followed by a decrease. The larger quantities of fresh solids added show a general trend to higher numbers of bacteria, but the addition of twice the quantity of fresh solids to ripe sludge does not increase bacterial numbers in the same proportion. In cases where a part of the liquid material is daily replaced by tap water effect of "washing" on sludge digestion), bacterial numbers remain practically constant after the first week.

Chemical, bacteriological, and zoological data show that daily additions of more than 2% by volume of fresh solids to ripe sludge is detrimental to efficient digestion. When the sludge is "washed" larger quantities of fresh solids can be added. It is clear, therefore, that a definite relation between ripe sludge and fresh solids must be maintained for the best practical results.

Partial Sterilization Studies.—Studies conducted to determine the effect of chemicals on bacteria and *Protozoa* show that the addition of hydrated lime in concentrations of 1:750 (1 part of lime to 750 parts of sludge and liquid) did not have a repressing effect on the numbers of *Protozoa,* but seemed rather to stimulate their growth as well as that of bacteria in the beginning. However, after the initial stimulation the bacteria decreased in spite of the daily additions of fresh solids.

The addition of CS_2 emulsion in concentrations up to 1:5 000 killed all *Protozoa* and prevented their re-appearance for about a month although daily 3% fresh solids were added. The numbers of bacteria increased over the control. Additions of 1:7 500, 1:10 000 and 1:15 000 of CS_2 were effective in killing *Protozoa;* however, in the latter concentration, *Protozoa* increased considerably after 10 to 12 days. Bacteria are greatly stimulated in these concentrations. The CS_2 emulsions have a tendency to increase the acidity of the sludge-fresh solids mixtures.

Chemical Precipitation Studies.—It is of importance to know what effect chemicals have on the behavior of suspended solids and sludge. For digestion purposes the solids are wanted at the bottom of the tanks, while for drying sludge and fresh solids the material must float. It was found that, in general, acids

and acid salts cause the sludge and fresh solids to float, while alkalies and alkaline salts tend to settle them out. Treating the sludge and fresh solids with acids and alkalies in succession produces any desired effect provided the ammonia of acids and alkalies are calculated on the basis of total acidity and total alkalinity present in the material to be treated.

Publications.—The following papers have been published during the last fiscal year from the Sewage Sub-Station:

Rudolfs, Willem, *et al.* Studies on the Biology of Sewage Disposal. Third Annual Report, 1924, *Bulletin,* New Jersey Agricultural Experiment Station.

—Investigations on Biological Purification of Sewage. *Western Water-Works,* v. 61, 1924, pp. 1301-1303.

—Some Sewage Experimental Work Under Investigation at the Sewage Substation during 1924. *Proceedings* New Jersey Sewage Works Assoc., 1925.

—Film Removal in Sprinkling Filter Beds. *Public Works,* v. 55, 1924, pp. 344-345.

Lackey, James B. Are Microscopic Animals a Factor in the Foaming of Imhoff Tanks? *Public Works,* v. 56, 1925, pp. 344-345.

—Studies on the Biology of Sewage Disposal: The Fauna of Imhoff Tanks. *Bulletin,* New Jersey Agricultural Experiment Station, 1925.

Rudolfs, Willem. Organization and Program of the Sewage Substation and Some Results Obtained. *Proceedings,* Am. Water Works Assoc., v. 13, 1925, pp. 73-80.

—Studies on the Biology of Sewage Disposal: Some Recent Results. *Public Health News,* v. 9, 1925, pp. 305-307.

—Report of Sewage Substation: Paper Read before the New Jersey Sewage Works Association. *Proceedings,* 10th Annual Meeting, New Jersey Sewage Works Assoc., 1925.

Hotchkiss, Margaret. Studies on the Biology of Sewage Disposal: Some Factors Influencing the Bacteriological Flora of an Imhoff Tank. *American Journal of Public Health,* v. 15, 1925, pp. 702-704.

Rudolfs, Willem, and **F. Leslie Campbell.** The More Unusual Imhoff Tank Gases. *Engineering News-Record,* October 1, 1925.

Rudolfs, Willem, *et al.* Studies on the Biology of Sewage Disposal. Fourth Annual Report, *Bulletin,* New Jersey Agricultural Experiment Station. (In press.)

Rudolfs, Willem, H. Heukelekian, and **P. J. A. Zeller.** Contributions to the Knowledge of Sludge Digestion: The Relation Between Ripe Sludge and Incoming Fresh Solids. (In press.)

Respectfully submitted,

C. G. Wigley.

Progress Reports of Special Committees of the Society

Progress Report of the Special Committee to Codify Present Practice on the Bearing Value of Soils for Foundations, etc.*

To the Board of Direction,
American Society of Civil Engineers:

Your Special Committee appointed (1) to Codify Present Practice on the Bearing Capacity of Soils for Foundations; and, (2) to Report on the Physical Characteristics of Soils in Relation to Engineering Structures, respectfully submits this report of progress.

During (1925) your Committee held three meetings, and the minutes of these meetings have been submitted to the Board of Direction. The expenses of your Committee have been nominal.

Under the first division of its work your Committee presented a résumé in 1923,† but much data have been accumulated since that time. After full deliberation your Committee has concluded to submit this part of its final report in the form of a "Manual of Practice", setting forth succinctly the results of its labors under appropriate sections. It is the intention of your Committee to edit and condense these sections into useful space consistent with an adequate presentation of the facts. The bibliography previously submitted‡ will be brought up to date. Sections will be devoted to the common type of foundations, and experts are invited to contribute of their knowledge of special types. Failures, etc., will be considered.

It is expected that the report will outline the present state of the art. For this reason it is hoped that the members of the Society will respond to the desire of the Committee to make the "Manual" a representative and dependable authority on the subject.

In the preparation of this undertaking your Committee is again faced with the need for adequate funds to meet their necessary expenses. It is thought that the "Manual" should appeal to members interested in foundations (and nearly all engineers have to do wtih them), and possibly some might be disposed to assist the Committee by offering contributions to the funds for its preparation. Under the second division of its work—"Physical Characteristics of Soils in Relation to Engineering Structures"—"your Committee has continued the study of colloids in soils as distinguished from a "colloidal state" of the soils, such as may be noted in a fine quicksand or other jelly-like condition. The extraordinary development of this new feature, that is, the colloidal content

* Presented to the Annual Meeting, January 20, 1926.
† *Proceedings*, Am. Soc. C. E., October, 1923, Papers and Discussions, p. 1738.
‡ *Loc. cit.*, August, 1917, Papers and Discussions, p. 1192.

of soils, is impressive particularly within the scope of industrial undertakings. The researches now being conducted by contemporary interests lead the Committee to expect much further assistance from these sources, as has been the case in the past.

It has been previously reported that the colloidal materials extracted from different soils may vary widely in adsorptive capacity, in heat of wetting, and in chemical composition, etc. From investigations by the U. S. Bureau of Soils into the size of particles, the swelling, and viscosity, it appears that the colloidal materials extracted from different soils vary with respect to these properties; but the various properties of the colloid appear to be more or less related. A colloid, for instance, which undergoes a large volume change when wetted by water shows a high heat of wetting and a high adsorptive capacity.

A knowledge of the inter-relationship of the properties of soil colloids and of the correlation between chemical composition and properties is of practical value in supplying a basis for predicting the general behavior of the colloids, without extensive physical tests or chemical analysis. The study of this phase of the problem will be continued and your Committee will report further developments.

Your Committee is indebted to Dr. R. O. E. Davis, Chief, Division of Soils Physics, Bureau of Soils, United States Department of Agriculture, for his views on "Physical Properties of Soils as Related to Colloidal Matter", which is appended hereto. (See Appendix I.)

Acknowledgment is also due to the following for co-operation and contributions during the past year: A. W. Münster, M. Am. Soc. C. E., for a discussion on pile-driving; S. J. Fortin, M. Am. Soc. C. E., for a discussion on the influence of bearing areas; F. E. Schmitt, M. Am. Soc. C. E., for a series of articles on "Soil Mechanics" by Charles Terzaghi, Assoc. M. Am. Soc. C. E.; also, Mr. Terzaghi for a copy of his book in German on "Soil Mechanics", from which excerpts have been prepared by George Paaswell, M. Am. Soc. C. E.; and I. Oesterblom, M. Am. Soc. C. E., for an article on "Colloidal Phenomena and Their Significance to the Structural Engineer."

Your Committee has been invited by Mr. Ottokar Stern to consider the proposed regulations governing foundations in Austria which are to take effect June 30, 1926. These regulations are being translated.

Your Committee would record its pleasure and gratification in receiving expressions of appreciation of the importance of its work from world-wide sources. If funds were available, it might be taken for granted that progress would be correspondingly expedited.

Your Committee again appeals and still hopes that its work which falls within the scope of laboratory research will appeal to the faculties of educational and other public institutions among whom are many eminent members of the Society. The field offers a fruitful opportunity for original work and an incentive for those having the facilities. Your Committee would gladly co-operate.

During the coming year your Committee will continue the preparation of the "Manual of Practice" and the study of colloids in soils.

Respectfully submitted,

ROBERT A. CUMMINGS, *Chairman.*

JANUARY 20, 1926.

The Committee:
ROBERT A. CUMMINGS, *Chairman,*
E. G. HAINES, *Secretary,*
W. J. DOUGLAS,
J. C. MEEM,
ALLEN HAZEN,
GEORGE PAASWELL.

APPENDIX I

PHYSICAL PROPERTIES OF SOILS AS RELATED TO COLLOIDAL MATTER

BY R. O. E. DAVIS,* ESQ.

There are certain properties of soils well known for their association with materials of high clay content, and it has been suggested that these properties are due to the colloidal material present wherever they are exhibited. Such an opinion has been held by many soil investigators, but it has been difficult to explain the association of some of these properties with the quantity of material which could be separated from soils in a colloidal state. Only within the last few years a method of separating the colloid from the remainder of the soil has been worked out, and this has shown that the colloid present in soils is of much greater quantity than had previously been supposed. The separation and collection of the colloid has made it possible to begin a study of its nature, and to investigate the quantitative relations between the colloid and physical properties.

Of fundamental importance in engineering work, as well as in agricultural utilization of soils, is the mechanical composition. There are certain broad generalizations concerning mechanical composition by which soils are spoken of as being sand or clay or loam, recognizing by such designations the predominance of either sand grains or clay material, or mixture of the two. The more accurate determination of the physical composition is arrived at by carrying out a mechanical analysis. Many plans have been devised for making such analysis and much of value has been derived from them, but it has only recently been shown that many of these analyses are of such a nature that they do not adequately represent the ultimate physical composition. The difficulty has not been in the processes themselves but in the preparation of the material before the separation of the different sized grains is made. Soils carrying moderate or high percentages of colloid quite frequently have the

* Chf., Div. of Soils Physics, Bureau of Soils, U. S. Dept. of Agriculture, Washington, D. C.

colloidal material present in aggregates which are not easily broken down even when subjected to eight or ten hours of constant shaking with water, and, on subsequently separating the different sizes of grains, these aggregates appear along with the sand and silt sizes.

The adoption of a method in which the preparation of the material is such that the dispersion of the colloidal aggregates is complete, gives results quite different from those obtained where the dispersion is incomplete. The most effective method of dispersion has been found to be a gentle rubbing of the material with a small quantity of water, this operation being repeated a number of times. Other methods which have given good results, but may fail in particular cases, are the use of acids or alkalis, or boiling the soil in water. As an ultimate basis of comparison between the soils, it is of great importance that the dispersion of the colloidal aggregates is complete before the separation of the different sized grains is undertaken. In connection with the fact that colloidal aggregates occur in soils, it should be mentioned that this aggregation at times is so pronounced that a soil material made up very largely of colloidal particles may exhibit much the properties of a loam or sandy soil, while on the other hand, one in which the colloid is not aggregated may be very impervious and hard to handle. While the difference in these states is due partly to difference in composition of the colloid, similar differences may be brought about by flocculation or deflocculation through chemical treatment. This offers a field of investigation of particular importance where unsuitable material is encountered.

There are certain physical properties associated with the soils, and especially with clay soils which are ascribed to the presence of colloid. One of these is the absorption of gases such as ammonia, water vapor, and solids such as dyes or fertilizer materials. This water absorption furnishes a method of estimating the quantity of colloid in the soil, and while it varies with the difference in chemical composition of the colloidal material in the case of water vapor over sulfuric acid of 3.3% concentration and at 25° cent., it is almost independent of the nature of the colloid. By determining the absorption under these conditions on a number of soils and on colloid extracted from them, it has been found that a fairly accurate estimation of the colloid present may be obtained by determining the absorption on a sample of soil and dividing that value by 0.3 per cent.

Another distinctive characteristic of soil colloid is its stickiness. Sand grains without colloid in a dry state have practically no binding power, but if mixed with colloid, the binding power is very rapidly increased. In general, this varies with the quantity of colloid present, but again there is also found to be a variation depending on a difference in the chemical composition of the colloid. It is very important, in carrying out such tests, that the conditions be well standardized as the results obtained are influenced by the quantity of water mixed with the material when it is compressed into briquettes. It is also very important that a thorough deflocculation of the colloid be established and that there be complete mixing between the colloid and mineral grains. The careful drying of compressed briquettes must be carried out to prevent checking and in moulding the briquettes a uniform pressure is necessary. A number of tests on briquettes, 25 mm. high, compressed at 2 500 lb. per sq. in., showed the influence of several factors on the binding power.

As already stated, the quantity of colloid is probably of greatest importance, but tests on well graded sand mixed with different percentages of the same colloid showed that there was an increase in breaking strength up to 30% of colloid, after which the value decreased. This would seem to indicate that at this percentage the pore spaces between the grains of sand had become filled with colloid; that is, the colloid was acting as a cementing material between the sand grains up to this percentage. From this point, the binding power has been more strongly influenced by the cohesion of the colloid itself.

It is not surprising that binding power varies with different colloids. As these colloids were extracted from soils varying widely in character, they show differences in many of their properties. For example, the colloid from an adobe clay gave a briquette with about three times the strength of one with colloid from a red clay loam, the colloid having been mixed with 25% of quartz flour in each case. These differences may be due to chemical composition or the size of the colloidal particles themselves or the quantity of organic matter included. The real cause of the difference has not been determined.

If the action of the colloid is that of cementing mineral grains, it would naturally be expected that the size of the grains and their distribution as to uniformity would have an effect on the binding power, and this has been found to be true. There is an increase generally in the binding power of the colloid as the size of the grains decrease, the silt size giving a value of about six times that of coarse sand while the average diameter of the two groups is about three to one. As a factor associated with the size of grain is the surface of these grains, and while it has been shown that binding power is a function of the surface of the larger grains, exact relationship has not been determined.

The relation of the moisture content of the soil to the colloid material is also of great importance. A change in moisture content produces a great change in the volume occupied by the soil colloid. Undoubtedly, the cracking and checking of heavy clay soils are due primarily to changes in volume of the colloidal material present. This property has a profound effect on the movement of water in the soil material, on percolation, and on evaporation. Certain experiments with sand mixtures using several colloids from soils of different types have shown decreasing rates of percolation, with increasing percentages of colloid until the minimum percolation rate is reached at about 30% of colloid. In some soils the percolation increases with higher percentages, while in others it remains practically stationary. This would indicate that percolation reaches the minimum when pore space between the grains is occupied by colloid, but in some cases the colloid may become aggregated and hence the percolation increased with higher percentages. In other cases there is no aggregation and the percolation remains at the minimum.

The force with which water is held by the colloid present in the soil is very great. It requires a temperature of between 950° and 1 000° cent., to drive off the last trace of the water. When this is done, however, the water will not again be taken up by the colloid. When a soil is whirled in a centrifuge with such speed that the average force exerted on the particles is 10 000 gravity, the water retained in the soil is still rather high. The quantity retained is distinctly greater with soils containing considerable colloid than with those carrying small quantities of colloid. It has been suggested that part of the water in a soil is what may be designated an unfree condition, and it is probable that this so-called unfree water is water held by the colloid in the gel condition. It may be driven off at a temperature higher than that of the uncombined water. In other words, its boiling point is raised and similarly its freezing point is lowered. There may also take place movement between the particles of colloid when they are in contact, that is, one gel may give or receive water from another gel in contact with it. This colloidally held water has a profound influence on the water-holding capacity or the moisture equivalent of the soil. A general relation is evident between a moisture equivalent of the soil and its colloid content, although the exact terms of this relationship have not been determined.

There are certain other relations which have been determined in general that furnish evidence of the profound influence of the colloid on the physical properties of soils. It has been shown, for instance, that the weight of a given volume of soil decreases as the percentage of colloid increases, as would

be expected from the nature of the colloidal material which is the weathered and partly hydrated product of ordinary minerals. It has also been found that the pore space in the given volume increases with the increase in colloid percentage, but that the specific gravity increases with the decrease in colloid. The expansion of soil increases with the increase in colloid. All these properties have been found to be straight-line functions, but the rates of change are different. The presence of organic matter which itself is generally colloidal has about the same effect as an equal quantity of colloid, except in case of expansion where its effect is negligible.

This brief discussion does not attempt to cover completely the physical properties of soils and the relation of colloids to them. The writer has simply tried to point out a few of the more important points.

Engineering Societies Library

The services of the Engineering Societies Library are available to all members who wish searches, copies, translations, etc., or advice on technical literature. A collection of modern books is also available for loan to members in North America, at moderate rentals. Correspondence should be addressed to the Director, Engineering Societies Library, 29 West 39th Street, New York, N. Y., who will gladly give information concerning the charges for the various kinds of work. A more comprehensive statement in regard to this matter will be found on pages 110 and 111 of the Year Book for 1926.

Book Notices*

(January 1 to January 30, 1926)

Economic Geology. By H. Ries. Fifth Edition. N. Y., John Wiley & Sons, 1925. 843 pp., illus., maps, 9 x 6 in., cloth. $5.00.

In this new edition the author has endeavored to make such changes in subject-matter and statistics necessary to bring the book up to date without increasing its size.

Electric Railway Engineering. By C. Francis Harding and Dressel D. Ewing. Third Edition. N. Y., McGraw-Hill Book Co., 1926. 489 pp., illus., diagrams, tab., 9 x 6 in., cloth. $5.00.

This new edition of a well-known text has been completely revised and enlarged. A new chapter on motor-bus transportation and one on "Sources of Electrical Energy", has been added.

Festschrift Anlässlich des 100 Jährigen Bestehens der Technischen Hochschule Fridericiana zu Karlsruhe. Karlsruhe, C. F. Müller, 1925. 542 pp., illus., diagrams, tab., 10 x 7 in., ¾ cloth.

This handsome volume commemorating the centenary of the oldest technical college in Germany contains 38 papers by members of the Faculty, dealing with various subjects—mathematical, economic, mechanical, electrical, chemical, and physical. Among the papers of especial interest to engineers are: Simplification of Arch Calculations; Methods of Colonizing; City Planning and Building as a Province of Engineering; and the Influence of Repeated Loads on the Elasticity and the Strength of Concrete and Reinforced Concrete.

Fresh Air and Ventilation. By C.-E. A. Winslow. N. Y., E. P. Dutton & Co., 1926. 182 pp., 8 x 5 in., cloth. $2.00.

Experimentation during the past twenty years, culminating in the investigations of the New York State Commission on Ventilation, has radically changed the conception of what constitutes good ventilation and of how to obtain it. The present volume summarizes this work and its results.

Fuels and Their Combustion. By Robert T. Haslam and Robert P. Russell. N. Y., McGraw-Hill Book Co., 1926. 809 pp., illus., diagrams, tab., 9 x 6 in., cloth. $7.50.

This book treats first the origin, composition, and production of the natural fuels. The phenomena of combustion and the reactions are then considered in detail. The equipment is described and illustrated by modern apparatus, after which the secondary or manufactured fuels are discussed. The final chapters deal with the flow of fluids and with the transfer of heat. The text is based on a course of lectures at the Massachusetts Institute of Technology.

History of Engineering. By A. P. M. Fleming and H. J. Brocklehurst. Lond., A. & C. Black; [N. Y., Macmillan Co.], 1925. 312 pp., illus., 9 x 6 in., cloth. 12s/6.

* The statements made in these notices are taken from the books themselves, and this Society is not responsible for them. Unless otherwise specified, the books in this list have been donated by publishers.

With the exception of a chapter on ancient engineering, this account is limited to the development of engineering in Great Britain. The authors give a concise account of progress in the refinement of measurement, the construction of docks, harbors, canals, roads and bridges, the invention of the steam engine, the development of railroad, gas, oil and electric engineering, and of the influence of progress in iron making on engineering.

Popular Research Narratives, Vol. 2; Collected by the Engineering Foundation. Baltimore, Md., Williams & Wilkins Co., 1926. 174 pp., ports., 8 x 5 in., cloth. $1.00. (Gift of the Engineering Foundation.)

The wide general interest that the first volume of "Research Narratives" excited has led Engineering Foundation to publish a second volume. Here are fifty brief stories of useful inventions and discoveries, showing how the scientist and engineer proceed in advancing the welfare of mankind. The accounts are written in non-technical language, with unusual brevity, by men of experience in the subjects treated.

Railroad Construction. By Walter Loring Webb. Eighth Edition. N. Y., John Wiley & Sons, 1926. 849 pp., illus., diagrams, tab., 7 x 4 in., fabrikoid. $5.00.

Special attention has been given in this edition to the relations of locomotive power to grade, to the method of computation of locomotive power, and the effect of undulatory grades on power.

Science in the Modern World. By Alfred North Whitehead. (Lowell Lectures, 1925.) N. Y. Macmillan Co., 1925. 296 pp., 9 x 6 in., cloth. $3.00.

This volume is a study of some aspects of Western culture during the past three centuries, in so far as it has been influenced by the development of science. Professor Whitehead points out the primary concepts on which science seated itself; calls attention to the recent break-down of the Seventeenth Century settlement of physical principles; and criticizes the current philosophy of scientists.

Superpower, Its Genesis and Future. By William Spencer Murray. N. Y., McGraw-Hill Book Co., 1925. 237 pp., diagrams, maps, 9 x 6 in., cloth. $3.00.

This book, by the Engineering Chairman of the United States Government Superpower Survey, considers the question from a broader viewpoint than the Government report already issued. Stress is placed on the social and economic advantages to be gained by "superpower" production and distribution, and on the engineering problems.

Textbook on Hydraulics. By George E. Russell. Third Edition. N. Y., Henry Holt & Co., 1925. 311 pp., illus., tab.., 9 x 6 in., cloth. $3.50.

The primary purpose of this edition is to provide a brief, clear, and logical presentation of the fundamental principles of hydraulics for class-room use. It has been expanded sufficiently to answer as a reference book for engineers, the results of recent research work and the newer experimental data having been added.

Theory of Structures. By H. W. Coultas. (Engineering Degree Series.) N. Y., Isaac Pitman & Sons, 1925. 341 pp., diagrams, tab., 9 x 6 in., cloth. $4.50.

This British textbook meets the general needs of students. It covers the groundwork of the subject using fairly simple mathematics. References to more complete studies are appended to each chapter, with numerous examples.

Current Civil Engineering Literature

Key to Abbreviated References to Publications Indexed*

Abbreviated References.	Publication.	Place.
Am. C. Inst.	*American Concrete Institute, Proceedings* (Y.)	Detroit
A. I. E. E.	*American Institute of Electrical Engineers Journal* (M.)	New York
A. R. E. A.	*American Railway Engineering Association, Proceedings* (Y.)	Chicago
A. S. T. M.	*American Society for Testing Materials, Proceedings* (Y.)	Philadelphia
Am. Soc. C. E.	*American Society of Civil Engineers, Proceedings* (M.)	New York
Am. Soc. Mun. Impvts.	*American Society for Municipal Improvements, Proceedings* (Y.)	New York
Am. W. W. Assoc.	*American Water Works Association, Journal* (Bi-M.)	Baltimore
Am. Wood Prs. Assoc.	*American Wood Preservers Association, Proceedings* (Y.)	Chicago
Ann. P. et C.	*Annales des Ponts et Chaussées* (Bi-M.)	Paris
Ann. T. P. Belg.	*Annales des Travaux Publics de Belgique* (Bi-M.)	Brussels
Assoc. Ing. Gand.	*Annales de l'Association des Ingénieurs sortis des Ecoles Spéciales de Gand* (Q.)	Ghent
Bost. Soc. C. E.	*Boston Society of Civil Engineers, Journal* (M.)	Boston
Can. Engr.	*Canadian Engineer* (W.)	Toronto
Cornell C. E.	*Cornell Civil Engineer* (M.)	Ithaca
Dock & Harbour	*Dock and Harbour Authority* (M.)	London
Eng.	*Engineering* (W.)	London
Eng. & Contr.	*Engineering and Contracting* (W.)	Chicago
Eng. Inst. Can.	*Engineering Institute of Canada, Journal* (M.)	Montreal
Eng. N. R.	*Engineering News-Record* (W.)	New York
Engrs. Soc. W. Pa.	*Engineers' Society of Western Pennsylvania, Journal* (M.)	Pittsburgh
Engr.	*Engineer* (W.)	London
Engrs. & Eng.	*Engineers and Engineering, Engineers' Club of Philadelphia* (M.)	Philadelphia
Gen. Civ.	*Le Génie Civil* (W.)	Paris
Gesund. Ing.	*Gesundheits Ingenieur* (W.)	Munich
Inst. C. E.	*Institution of Civil Engineers Minutes of Proceedings* (Q.)	London
Inst. Mun. & Co. Engrs.	*Institution of Municipal and County Engineers, Journal* (W.)	London
Int. Ry. Cong. Assoc.	*International Railway Congress Association, Bulletin* (M.)	Brussels
Land. Arch.	*Landscape Architecture* (M.)	Harrisburg
Mech. Eng.	*Mechanical Engineering* (M.) *Journal of the American Society of Mechanical Engineers*	New York
Mil. Engr.	*Military Engineer* (M.)	Washington
Min. & Metal.	*Mining and Metallurgy* (M.) *American Institute of Mining Engineers*	New York
Mun. & Co. Eng.	*Municipal and County Engineering* (M.)	Indianapolis
N. E. W. W. Assoc.	*New England Water Works Association, Journal* (M.)	Boston
N. Y. R. R. Club	*New York Railroad Club, Proceedings* (M.)	Brooklyn
Oest. Ing. Arch. Ver.	*Oesterreichischer Ingenieur und Architekten Verein, Zeitschrift* (F.)	Vienna
Power	*Power* (W.)	New York
Rev. Gen.	*Revue Générale des Chemins de Fer* (M.)	Paris
Ry. Age	*Railway Age* (W.)	New York
Ry. Eng. & Main.	*Railway Engineering and Maintenance* (M.)	Chicago
Ry. Rev.	*Railway Review* (W.)	Chicago
Schw. Bauz.	*Schweizerische Bauzeitung* (W.)	Zurich
Sci. Am.	*Scientific American* (M.)	New York
Soc. Ing. Civ. Fr.	*Société des Ingénieurs Civils de France, Mémoires et Comptes Rendus* (Q.)	Paris
Ver. deu. Ing.	*Verein deutscher Ingenieure, Zeitschrift* (W.)	Berlin
West. Ry. Club	*Western Railway Club, Proceedings* (M.)	Chicago
West. Soc. Engrs.	*Western Society of Engineers, Journal* (M.)	Chicago
Zeit. Bau.	*Zeitschrift fur Bauwesen* (Q.)	Berlin
Z. d. Bauver.	*Zentralblatt der Bauverwaltung* (W.)	Berlin

* Y = Yearly; Q = Quarterly; M = Monthly; F = Fortnightly; W = Weekly.

A. Applied Sciences

a. Processes of Calculation

2. Graphical and Nomographical Processes

Moments in Restrained and Continuous Beams by the Method of Conjugate Points.* Discussion: Hardy Cross, George Higgins, E. G. Walker, and Donald Derickson. Am. Soc. C. E. Feb., '26.

Zwei Nomogramme für die Eisenbetonbestimmungen 1925.* (Two Nomograms for the 1925 Reinforced Concrete Specifications.) Robert Jacki. Z. d. Bauver. Jan. 6, '26.

3. Stresses and Strains

Utilizable Capacity of Steel Members of Structures. Discussion: C. A. P. Turner, H. F. Moore, G. B. Woodruff, and R. von Fabrice. Am. Soc. C. E. Feb., '26.

Virtual Work: A Restatement.* Hardy Cross. Am. Soc. C. E. Feb., '26.

B. Applied Mechanics

a. Mechanics of Solids (Strength of Materials)

1. Mechanical Processes

Determination des fréquences critiques d'une pièce élastique.* (Determination of the Critical Frequencies of An Elastic Member.) E. Hahn. Schw. Bauz. Jan. 2, '26.

b. Hydraulics

1. Processes of Measurement

Universalstaurohr des Karlsruher Flussbaulaboratoriums.* (Universal Pitot Tube in the Karlsruhe Hydraulic Laboratory.) Th. Rehbock. Ver. deu. Ing. Jan. 2, '26.

Die Salzschwindigkeits-Methode von Allen zur Wassermessung in Rohrleitungen.* (The Allen Salt Velocity Method for Measuring Water in Pipe Lines.) Karl E. Müller. Schw. Bauz. Jan. 23, '26.

2. Physical Hydraulics

Side Channel Spillways: Hydraulic Theory, Economic Factors, and Experimental Determination of Losses.* Discussion: Ivan E. Houk, and J. C. Stevens. Am. Soc. C. E. Feb., '26.

3. Industrial Hydraulics

High-Speed Turbines for the Berne Hydro-Electric Power Station.* Eng. Jan. 15, '26.

Water Power in Italy: the Orba Torrent. (From *L'Energia Elettrica.*) Engr. Jan. 22, '26.

The Hydrodynamic Theory of Turbines and Centrifugal Pumps.* Bruno Eck. Eng. Serial beginning Jan. 22, '26.

Volcanic Formations Govern Design in Pit River 3 Hydro Development.* Walter Dreyer. Eng. N. R. Jan. 28, '26.

High Specific Speed Hydraulic Turbines in Their Bearing on the Proportioning of the Number of Units in Low-Head Hydro-Electric Plants. A Symposium. Discussion: Forrest Nagler. Am. Soc. C. E. Feb., '26.

La Captation de la Puissance des Vagues. Avantages et Avenir du Procédé Décrit.* (Capturing the Power of Waves. Advantages and Future of the Process Described.) P. van Vloten. Gen. Civ. Jan. 23, '26.

Beitrag zum Entwurf des Laufrades einer Francisturbine.* (Contribution to the Design of the Runner of a Francis Turbine.) K. Axel Ahlfors. Ver. deu. Ing. Jan. 16, '26.

Die erste Wasserkraftanlage zur Stromversorgung Wiens.* (The First Water Power Plant for Supplying Vienna with Electricity.) Felix L. Hartmann. Ver. deu. Ing. Jan. 30, '26.

Ueber die Zusammenschaltung von Wasserturbinen.* (On the Connecting Together of Water Turbines.) R. Thomann. Schw. Bauz. Jan. 30, '26.

4. Dams

Tests of Water Pressures Under Brule River Dam.* Eng. N. R. Feb. 18, '26.

Le Barrage d'Essais de Stevenson Creek (Etats Unis).* (The Experimental Dam on Stevenson Creek (United States). P. Caufourier. Gen. Civ. Jan. 2, '26.

Ueber die Versuchs-Gewölbe-Staumauer am Stevenson-Creek in Californien.* (On the Experimental Arch Dam on Stevenson Creek in California.) F. A. Noetzli. Schw. Bauz. Jan. 9, '26.

Die Bekampfung der Sohlen-Auskolkung bei Wehren durch Zahnschwellen. (Preventing the Scouring of the Bed with Weirs by Using Toothed Sills. Th. Rehbock. Schw. Bauz. Serial beginning Jan. 16, '26.

c. Pneumatics

3. Industrial Pneumatics

Die Arbeitsleistung des Windes am Windmühlenflügel.* (The Work Done by the Wind on the Sail of a Wind Mill.) Chr. Boedecker.* Z. d. Bauver. Dec. 30, '25.

C. Materials of Construction and General Processes

a. Lime, Cement, Mortar, Concrete, Brick, Bitumin, Timber, etc.

The Effect of Moisture on Concrete. Discussion: W. K. Hatt. Am. Soc. C. E. Feb., '26.

Effect of Manipulation on Strength of Field Concrete.* G. W. Hutchinson. Eng. N. R. Feb. 11, '26.

Ready Mixed Concrete Easily Sold in Birmingham, Ala.* W. E. Barker. Eng. N. R. Feb. 18, '26.

Das Dreistoffsystem Kalk, Kieselsäure, Tonerde und die hydraulischen Bindemittel.* (The Ternary System Lime, Silicic Acid, Alumina and the Hydraulic Binders.) Richard Grün. Z. d. Bauver. Jan. 6, '26.

b. Metals

Effect of the Cutting Flame on Steel.* (From *Oxy-Acetylene Tips.*) Can. Engr. Feb. 9, '26.

Comparaison des Limites Elastiques des Aciers Durs à la Traction et au Cisaillement par Torsion.* (Comparison of the Elastic Limit of Hard Steel in Tension and Shear by Torsion.) F. Crestin. Gen. Civ. Jan. 2, '26.

La Fabrication des Plaques de Blindage. (The Manufacture of Armor Plate.) L. Bacle. Gen. Civ. Jan. 30, '26.
Nichtrostender Stahl. (Non-Rusting Steel.) E. Richards. Schw. Bauz. Serial beginning Jan. 30, '26.

c. Preservation and Use of Materials, Painting, Waterproofing

New Creosoting Plant of Southern Pacific Railway.* A. F. Bonnalie. Eng. & Contr. Jan. 20, '26.
Features in Wood Preservation Development. (Abstracts of papers read before Am. Wood Prs.' Assoc.) Eng. N. R. Feb. 18, '26.
Rosten und Rostschutz. (Rust and Protection Against Rust.) H. Tilly. Gesund. Ing. Jan. 9, '26.
Die Holzschädlinge der Meereskusten und ihre Bekampfung.* (Damage to Wood on the Sea Coast and Its Prevention. F. Roch. Ver. deu. Ing. Jan. 16, '26.

f. Rock Excavation, Mining, Rock Removal

Abstract of Institute Papers. Min. & Metal. Jan., '26.
Abstract of Institute Papers. Min. & Metal. Feb., '26.
La Reconstitution des Charbonnages du Nord et du Pas-de-Calais. Installations du Jour.* (Reconstruction of the Coal Mines of the Nord and Pas-de-Calais. Surface Installations.) Auguste Pawlowski. Gen. Civ. Serial beginning Jan. 2, '26.

g. Execution of Works, Specifications

One-Sided Clauses in Public Works Specifications. R. C. Marshall. (Paper read before Am. Road Bldrs. Assoc.) Mun. & Co. Eng. Jan., '26.

5. Of Reinforced Concrete

Planchers Monolithes en Bèton Armé Système Graux.* (Graux System of Reinforced Concrete Monolithic Floors.) F. Bravais. Gen. Civ. Jan. 23, '26.
Zwei Nomogramme für die Eisenbetonbesttimmungen 1925.* (Two Nomograms for the 1925 Reinforced Concrete Specifications.) Robert Jacki. Z. d. Bauver. Jan. 6, '26.
Ein Beitrag zur Kenntnis von dem Abbinden des Eisenbetons bei niedriger Temperatur.* (Contribution to Our Knowledge of the Setting of Reinforced Concrete at Low Temperatures.) Luz Davis. Z. d. Bauver. Jan. 13, '26.

h. Foundation, Bridge Piers, and Abutments

Sinking 86 Pneumatic Caissons in 100 Days.* Frank W. Skinner. Eng. & Contr. Jan. 20, '26.
Wet Foundation Methods for River Front Building. Eng. N. R. Feb. 18, '26.

k. Tunnels and Tunneling-Shield

Will Hole Through Moffat Tunnel in July, 1926.* C. A. Betts. Eng. N. R. Feb. 18, '26.

l. Construction Machinery and Tools—Drainage

Ueber Baukrane.* (On Cranes Used in Building.) W. Lattmann. Schw. Bauz. Jan. 2, '26.

x. Miscellaneous

Eigenschaften des Glases als Werkstoff.* (Properties of Glass as a Material.) E. Berger. Ver. deu. Ing. Serial beginning Jan. 9, '26.

D. Highways

a. Location

Highway Relocation Practice in Pennsylvania.* W. W. Crosby. (From paper read before Am. Road Bldrs. Assoc.) Eng. N. R. Feb. 11, '26.

c. Construction

How to Stop Cement Overrun in Pavement Construction. Robert E. O'Connor. (Paper read before Am. Road Bldrs. Assoc.) Mun. & Co. Eng. Jan., '26.
Recent Developments in Concrete Paving Practice. H. E. Surman. (Paper read before Am. Road Bldrs. Assoc.) Mun. & Co. Eng. Jan., '26.
Recent Developments in Bituminous Paving Practice. Henry M. Rex. (Paper read before Am. Road Bldrs. Assoc.) Mun. & Co. Eng. Jan., '26.
Bureau of Engineering Research Work. A. T. Goldbeck. (Paper read before Nat'l Crushed Stone Assoc.) Can. Engr. Jan. 26, '26.
Accelerated Concrete Road Building.* Can. Engr. Jan. 26, '26.
Reinforcement of Concrete Roads. C. A. Hogentogler. (Paper read before Nat'l Crushed Stone Assoc.) Can. Engr. Feb. 2, '26.
Trench Openings in Highways.* Roland Fletcher. Inst. Mun. & Co. Engrs. Feb. 2, '26.

g. Machinery and Tools

Economics of Highway Equipment Standardization. C. H. Powel. (Paper read before Am. Road Bldrs. Assoc.) Mun. & Co. Eng. Jan., '26.
Unloading Plant Practice on Road Work.* Robert P. Petersen. (Abstract of paper read before Am. Road Bldrs. Assoc.) Eng. N. R. Feb. 18, '26.

h. Vehicles, Automobiles, Traffic

Commercial Vehicles on Free Highways. Thomas H. MacDonald. (From *Journal* Land and Public Utility Economics.) Mun. & Co. Eng. Jan., '26.
Traffic Relief Recommendations for New York City.* Eng. N. R. Feb. 18, '26.
La Circulation dans les Grandes Villes.* (Traffic in Large Cities.) P. Caufourier. Gen. Civ. Jan. 16, '26.
Aufgaben der Forschung im Kraftfahrwesen.* (Automobile Research Problems.) P. Langer. Ver. deu. Ing. Jan. 30, '26.

x. Miscellaneous

Keeping Construction Cost Records. W. R. Smith. (Paper read before Am. Road Bldrs. Assoc.) Mun. & Co. Eng. Jan., '26.

E. Bridges, Viaducts, and Arches

a. Timber Bridges and Viaducts

How the Southern Pacific Protects Timber Bridges from Fire.* H. Pollard. Ry. Eng. & Main. Feb., '26.

b. Iron and Steel Bridges and Viaducts

Building Four-Track Steel Bridge Over Newark Bay: Two Types of Foundation.* Eng. N. R. Feb. 4, '26.

Anchorage and Bearing Details of Rigolets Bridge; L. & N. R. R.* Eng. N. R. Feb. 18, '26.

Grundsätze für die bauliche Durchbildung eiserner Eisenbahnbrücken der Deutschen Reichsbahn-Gesellschaft.* (Fundamentals, by the Deutschen Reichsbahn Gesellschaft, for the Building of Iron Railway Bridges.) Rich. Sonntag. Z. d. Bauver. Jan. 13, '26.

d. Concrete and Reinforced Concrete Bridges and Viaducts

The Construction of the New Oswald Street Bridge, Glasgow.* W. L. Scott. Engr. Jan. 15, '26.

Wairoa River Reinforced Concrete Bridge.* Engr. Jan. 22, '26.

h. Computation, Tests, etc.

British Standard Unit Loading for Highway Bridges.* J. M. Liddell. Engr. Jan. 29, '26.

Temperature Deformations in Concrete Arches.* Hardy Cross. Eng. N. R. Feb. 4, '26.

F. Inland Waters and Waterways

The St. Lawrence Waterway to the Sea. Discussion: E. G. Walker. Am. Soc. C. E., Feb., '26.

c. Regulation of Waterways—Volume of Discharge, Freshets, Floods, Soundings

Ice Conditions in St. Lawrence River. Howard T. Barnes. (From paper read before Shipping Federation and Board of Trade, Montreal.) Can. Engr. Feb. 9, '26.

1925 Drought Breaks All Records in Southern Appalachians.* E. D. Burchard. Eng. N. R. Feb. 11, '26.

d. Diverting Dams, Locks, Lifts, Elevators, Inclined Planes

Lockport Lock Construction Plant, Illinois Waterways.* Eng. N. R. Feb. 11, '26.

k. Utilization of Inland Waterways, Freight, Capacity

Relation of the Ohio River and Its Tributaries to Transportation in the United States. Discussion: Frank H. Alfred. Am. Soc. C. E. Feb., '26.

G. Maritime Works

c. Vessels and Maritime Navigation, Lighthouses, Buoys, Various Signals

Marine Oil-Engine Trials.* (Read before Inst. Mech. Engrs.) Eng. Serial beginning Jan. 15, '26; Engr. Jan. 15, '26.

1 000-H. P. Two-Stroke Diesel Engine.* Eng. Jan. 15, '26.

Modern Ship Design.* Percy A. Hillhouse. (Paper read before Greenock Philosophical Soc.) Eng. Jan. 29, '26.

Ship Waves and Ship Resistance. Eng. Feb. 5, '26.

d. Roads and Outer Harbors. Dikes and Jetties. Breakwaters

Conséquences de la Construction d'une Double Jetée au travers du Pas-de-Calais, au Point de Vue du Régime des Courants et Marées. (Effects of the Construction of a Double Jetty Across Pas-de-Calais, from the Viewpoint of Currents and Tides.) J. Jaeger. Gen. Civ. Jan. 30, '26.

g. Dredges and Dredging, Force Pumps, Refloating and Removing Wrecks, Ice-Breakers

High Power Hydraulic Dredge for General Contracting.* Jean M. Allen. Eng. N. R. Feb. 4, '26.

h. Boats, Barges

Grue Flottant de 300 Tonnes pour la Manutention des Blocs de Béton dans le Port de Valence (Espagne).* 300-Ton Floating Crane for Handling Concrete Blocks in the Port of Valence (Spain).) Gen. Civ. Jan. 23, '26.

Neue Einziehkrane für den Seehafenumschlag.* (New Unloading Cranes for (Freight) Handling at Seaports.) C. Overbeck. Ver. deu. Ing. Jan. 16, '26.

i. Traction, Haulage, Towing, Mechanical Tractors

Etat Actuel et Nouveaux Projets d'Extension du Port de Marseille.* (Present Conditions and New Projects for Enlarging the Port of Marseille.) G. Mesnard. Gen. Civ. Jan. 9, '26.

An Analysis of a Failure of Keel Blocks in a Drydock.* E. L. Gayhart. (Paper read before Soc. Naval Archts. and Marine Engrs.) Eng. Jan. 22, '26.

j. Dockyard Machinery and Shipyards, Drydocks

Messrs. T. W. Greenwell and Co.'s Dry Dock, Sunderland.* Eng. Serial beginning Jan. 29, '26.

H. Railroads. Street and Interurban Railways. Automobiles. Aeronautics

a. Railroads

1. General Articles

Northern Pacific Purchases on Pre-War Basis.* Ry. Age Feb. 20, '26.

Fünfzig Jahre Staatseisenbahn in Niederländisch-Indien.* (Fifty Years of Government Railroads in the Dutch East Indies.) Krähling. Ver. deu. Ing. Jan. 9, '26.

4. Track

Relaying Railway Track by Machine.* Engr. Jan. 15, '26.

How a Track Was Moved 500 Miles.* George E. Olson. Ry. Eng. & Main. Feb., '26.

5. Signals and Safety Apparatus

Automatic Train Control. A. H. Rudd. Engrs. & Eng. Jan., '26.

Automatic Signals Constructed in Record Time on Seaboard.* Ry. Age Jan. 30, '26.

Power Brake Investigation Now Making Rapid Progress.* Power Feb. 6, '26.

Note sur un Nouveau Post d'Enclenchement Electro-Mécanique suivie d'une Note sur les Enclenchements par Cylindres d'Intinéraires dans les Postes Saxby.* (Note on a New Electro-Mechanical Interlocking Station, Followed by a Note on Interlocking by "Route Cylinders" in the Saxby Stations.) Lefèvre. Rev. Gen. Jan., '26.

Die Sicherung der Niveau-Uebergänge.* (Safety of Grade Crossings.) Hans Hunziker. Schw. Bauz. Dec. 26, '25.

6. Rolling Stock (Locomotives, Cars) Fuel

Derailments of Locomotives on Curves.* Roy C. Beaver and Marion B. Richardson. (From *Ry. Mech. Engr.*) Dec., '25.

Methods Employed by the Italian State Railways for Testing Locomotive Performances.* Alessandro Maccini and Guido Corbellini. Int. Ry. Cong. Assoc. Dec., '25.

New Locomotives for the Norfolk and Western Railway.* Engr. Jan. 22, '26.

4-8-2 Type Locomotives for N. Y. C.* Ry. Age Jan. 30, '26.

Union Pacific Tests Three Cylinder Engine.* W. W. Baxter. Feb. 6, '26.

Superheat for Locomotive Boilers.* C. A. Seley. Ry. Rev. Feb. 6, '26.

Vauclain Discusses Outlook for Diesel Locomotive. Samuel M. Vauclain. (Abstract of paper read before Midwest Power Conference.) Ry. Age Feb. 6, '26.

Railroad Opens Large Strip Mine in Rosebud Coal Field.* H. E. Stevens. Ry. Age Feb. 6, '26.

4-8-2 Type Locomotives for the Texas & Pacific.* Ry. Age Feb. 13, '26.

Pitting-Aemythcor a Menace?* D. A. Steel. Ry. Age Feb. 20, '26.

Le Train Articule du Canadian National Railway á Automotrice Petroleo-electrique.* (The Articulated Train on the Canadian National Railway with Oil-Electric Locomotive.) Gen. Civ. Jan. 9, '26.

Weitere Aussichten für die Verwendung der Dampfturbine als Lokomotivantrieb.* (Further Views on the Use of the Steam Turbine to Drive Locomotives.) U. R. Ruegger. Schw. Bauz. Serial beginning Jan. 9, '26.

7. Use of Electricity

Short Memorandum on the Electrification of the Chilian Section of the Transandine Railway Company.* A. J. J. Fifer. Int. Ry. Cong. Assoc. Dec., '25.

Illinois Central Electrification Progress.* Ry. Age Feb. 13, '26.

8. Stations, Terminals, Engine Houses, Shops

St. Paul Union Depot Completed.* G. H. Wilsey. Ry. Age Feb. 13, '26.

Subways on Chicago Terminal of Illinois Central R. R.* Eng. N. R. Feb. 18, '26.

9. Technical and Commercial Use

The Railroad and the Motor Bus. H. F. Fritch. (Paper read before Soc. Automotive Engrs.) Mun. & Co. Eng. Jan., '26.

Main Tracking of Freight Trains. D. W. Dinan. (Abstract of paper read before Central Ry. Club.) Ry. Age Feb. 13, '26.

d. Street Railways, Elevated Railways, Subways

1. General Articles

Use Modern Concrete Methods on Large Subway Project.* Ry. Age Feb., '26.

e. Automobiles

2. Internal Combustion Engine Automobiles

Self-Propelled Cars and Locomotives. (Paper read before Iowa Eng. Soc.) Ry. Age Feb. 13, '26.

f. Aeronautics

4. Aerodromes and Landing Fields

210-Ft. Airship Mooring Tower at Detroit Airport.* Herbert V. Thaden. Eng. N. R. Feb. 4, '26.

I. Municipal Water-Works. Agricultural Engineering. Irrigation

a. General Articles

The California Railroad Commission and the Water Works Man. Am. W. W. Assoc. Jan., '26.

b. Hydrology, Water Resources

Increasing the Capacity of Ground Water Supplies. W. G. Kirchoffer. Am. W. W. Assoc. Feb., '26.

c. Dams and Reservoirs

Effect of Impounding Reservoir on Water at Greensboro, N. C. C. W. Smedberg. Am. W. W. Assoc. Jan., '26.
The Sennar Dam.* Eng. Jan. 22, '26.
The Queen Mary Reservoir Conduit.* Engr. Serial beginning Jan. 29, '26.
Design and Construction of Concrete-Lined Distributing Reservoirs.* I. E. Flaa. Am. W. W. Assoc. Feb., '26.
Balancing Reservoirs to Supplement Pump Capacity During Peak Demands.* Edmund K. Barnum. Am. W. W. Assoc. Feb., '26.
Stresses in Thick Arches of Dams.* B. F. Jakobsen. Am. Soc. C. E. Feb., '26.
Stresses in Thick Arches of Dams.* Discussion: William Cain. Am. Soc. C. E. Feb., '26.
The Oradell Dam of the Hackensack Water Company.* Discussion: Thaddeus Merriman, Lazarus White, Albert C. Arend, and Paul E. Gisiger. Am. Soc. C. E. Feb., '26.
Multiple-Arch Dam at Gem Lake on Rush Creek, California. Discussion: B. F. Jakobsen, J. D. Galloway, I. Oesterblom, B. C. Collier, and Fred A. Noetzli. Am. Soc. C. E. Feb., '26.
Huge Reservoir and Pumping Plant for London Water Supply.* Eng. N. R. Feb. 4, '26.
Multiple Arch Reinforced Concrete Dam.* H. Speight. Can. Engr. Feb. 9, '26.

d. Analysis and Purification of Water

Sterlization with Freshly Prepared Hypochlorite.* H. A. Lilly. Am. W. W. Assoc. Jan., '26.
The Relation of Storage Water Supply Lakes to Malaria. J. A. Le Prince. Am. W. W. Assoc. Jan., '26.
Recording the Hydrogen Ion Concentration of Potable Water.* Henry C. Parker and John R. Baylis. Am. W. W. Assoc. Jan., '26.
Use of Chinic Acid in the Differentiation of the Colon-Aerogenes Groups.* B. H. Butcher. Am. W. W. Assoc. Feb., '26.
Nitrate Determinations. Geo. W. Burke. Am. W. W. Assoc. Feb., '26.
Colon Bacteria in Scme Fissure Springs of the Balconies Fault Zone.* I. M. Lewis. Am. W. W. Assoc. Feb., '26.
Problems of Hard and Soft Water. Ross A. Thuma. Am. W. W. Assoc. Feb., '26.
Water Treatment in Ohio. W. H. Dittoe. Am. W. W. Assoc. Feb., '26.

e. Distribution of Water

Effect of Water Rates and Growth in Population Upon Per Capita Consumption.* Leonard Metcalf. Am. W. W. Assoc. Jan., '26.
Sterilization of Water Mains After Laying. C. W. Absher. Am. W. W. Assoc. Jan., '26.
Construction of Steel Portion of Providence Aqueduct.* Bayard F. Snow. Eng. N. R. Jan. 28, '26.
The Improved Venturi Flume.* Discussion: Julian Hinds, E. A. Jacob, and J. C. Stevens. Am. Soc. C. E. Feb., '26.
Laying Cast Iron Mains: Organization and Methods.* Homer V. Knouse. Am. W. W. Assoc. Feb., '26.
Flow Tets of Old Cast-Iron Water Mains, Chicago Water-Works.* J. B. Eddy. Eng. N. R. Feb. 18, '26.
Die Wasserversorgung und Entwässerung der Turmhausbauten. (Water Supply and Drainage of Tower Buildings.) Otto Spiegelberg. Gesund. Ing. Jan. 2, '26.

f. Drainage of Land

The Taylor Ave. Reclamation Project, Astoria, Oregon.* Eng. & Contr. Jan. 20, '26.

J. Sewerage. Sewage and Refuse Disposal

a. Sewers and Drains

The Ocean Outfall Sewer Syphon Under the Middle Harbour, Sydney, N. S. W. Eng. Jan. 29, '26.
The Reinforced Concrete Arch in Sewer Construction: A Review of Past Practice in Design and an Account of Recent Studies in St. Louis, Missouri. Discussion: Charles S. Whitney and Jacob Feld. Am. Soc. C. E. Feb., '26.
Public Utility Services Under Highways. G. P. Warner Terry. Inst. Mun. & Co. Engrs. Feb. 2, '26.

b. Sewage Disposal, Purification

Sewage Disposal Plant, York Township.* E. M. Proctor. Can Engr. Jan. 26, '26.
Stream Pollution: A Symposium. Discussion: H. A. Whittaker. Am. Soc. C. E. Feb., '26.
The Heat-Drying of Sludge at the Baltimore Sewage Works.* C. E. Keefer. Eng. N. R. Feb. 11, '26.

c. Refuse Disposal

Elimination of Odors from Garbage Disposal Works. Discussion: Samuel A. Greeley. Am. Soc. C. E. Feb., '26.
Dumping of Garbage at Sea Resumed by Oakland.* Eng. N. R. Feb. 4, '26.

K. Heat Engines

a. Steam Engines, Boilers

Fundamentals in the Conditioning of Boiler Waters.* R. E. Hall. Engrs. Soc. W. Pa. Dec., '25.

L. Electricity

b. Distribution and Transmission of Electricity

3. Distribution and Wiring of Electricity

Les Problèmes Techniques et Economiques de l'Electrification Rurale.* (Technical and Economic Problems of Rural Electrification.) A. Bidault des Chaumes. Gen. Civ. Jan. 30, '26.

d. Mechanical Uses of Electricity

1. Electric Motors

Effects of Changing the Load on a Synchronous.* J. M. Cunningham. Power Jan. 19, '26.

2. Servomotors, Hoists, Elevators, Handling Machinery

Steam and Electric Service in Detroit's Largest Hotel.* Power. Jan. 19, '26.

f. Signals and Communication

Cipher Printing Telegraph Systems for Secret Wire and Radio Telegraphic Communications.* G. S. Vernam. A. I. E. E. Feb., '26.

An Epoch-Making Engineering Achievement.* Francis A. Westbrook. Sci. Am. Feb., '26.

Die Grossfunkstelle Monte Grande bei Buenos Aires (Argentina).* (The Large Monte Grande Radio Station at Buenos Aires (Argentina)). Carl W. Doetsch. Ver. deu. Ing. Jan. 2, '26.

M. Architecture

c. Residences, Hotels

Housing: A Brief Review of Some Modern Methods of House Construction.* Percy Morris. Inst. Mun. & Co. Engrs. Jan. 19, '26.

f. Factories and Mill Buildings

Les Grands Moulins de Paris.* (The Large (Flour) Mills in Paris.) P. Calfas. Gen. Civ. Jan. 16, '26.

g. Other Buildings

Municipal Retail Market and Garage at St. Louis.* L. R. Bowen. Eng. N. R. Feb. 18, '26.

Das Kirchgemeindehaus Enge in Zürich.* (The Enge Parish House in Zürich.) Schw. Bauz. Jan. 2, '26.

i. Fire Protection

Fire at the Chateau Frontenac, Quebec.* C. V. Johnson. Can. Engr. Feb. 2, '26.

x. Miscellaneous

Building in Earthquake and Tornado Regions. Robins Fleming. Eng. Serial Jan. 22, '26.

Q. Surveying and Geodesy

Mapping Unknown Alaska.* Guy E. Mitchell. Sci. Am. Feb., '26.

S. City Planning

Regional Planning and Road Development. Herbert H. Humphries. Inst. Mun. & Co. Engrs. Jan. 19, '26.

Employment Service

The Engineering Societies Employment Service is under the joint management of the National Societies of Civil, Mining, Mechanical, and Electrical Engineers. A Chicago office is maintained in co-operation with the Western Society of Engineers, and a San Francisco office, in co-operation with the Engineers' Club of San Francisco and the California Section of the American Chemical Society. The Service is available only to the several memberships and is maintained by contributions from the Societies and their individual members who are directly benefited.

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Men Available.—Under this heading, brief announcements will be published without charge. These announcements will not be repeated, except on request received after an interval of one month. Names and records will remain in the active files of the Service for a period of three months, and are renewable on request. Notices for *Proceedings* should be addressed to Employment Service, 33 West 39th Street, New York, N. Y., and should be received prior to the first of the month.

Opportunities.—A Bulletin of engineering positions available is published weekly and may be obtained by members of the Societies concerned at a subscription rate of $3 per quarter, or $10 per annum, payable in advance. Positions which are not filled promptly as a result of publication in the Bulletin, may be announced herein.

Voluntary Contributions.—Members obtaining positions through the medium of this Service are invited to co-operate with the Societies in the financing of the work by nominal contributions made within thirty days after placement, on the basis of $10 for all positions paying a salary of $2 000 or less per annum; $10 plus 1% of all amounts in excess of $2 000 per annum; temporary positions (of one month or less), 3% of total salary received. The income contributed by the members, together with the finances appropriated by the four Societies named, will be sufficient, it is hoped, not only to maintain but to increase and extend the service.

Replies to Announcements.—Replies to announcements published herein, or in the Bulletin, should be addressed to the key number indicated in each case, with a two-cent stamp attached for re-forwarding, and forwarded to the Employment Service at the address given. Replies received by the Service after the positions to which they refer have been filled, will not be forwarded.

POSITIONS AVAILABLE

ENGINEER, with executive and sales ability, capable of taking charge of and putting across a crusher proposition. Must have mechanical ability and experience in crushing stone. Investment of some capital necessary. Location, South. R–8351-C.

MEN AVAILABLE

PROFESSOR OF CIVIL ENGINEERING, M. Am. Soc. C. E.; married. Extensive teaching experience in municipal and sanitary engineering and several years in practice. Has also acted as Dean. Desires change of location. A–2670.

SUPERINTENDENT CONSTRUCTION, M. Am. Soc. C. E.; graduate C. E.; age 40; married. Ten years, assistant city engineer; ten years, engineer in charge large office building construction; three years, superintendent in charge of building construction. Well versed in highway construction and design. B–4326.

GRADUATE CIVIL ENGINEER, M. Am. Soc. C. E.; married; age 37. Fifteen years' experience in hydro-electric work, irrigation, drainage, railroads, rivers, and harbors. Excellent executive and construction man. Present salary, $5 000. Desires connection in going engineering and construction company with privilege of investment. B–5135.

EXECUTIVE ENGINEER, M. Am. Soc. C. E.; graduate M. I. T. in civil engineering; post-graduate course in engineering administration. Fourteen years' experience in public and private work (ten years continuous service with one employer). Specialist in highway design, construction and maintenance. Present salary, $5 000. Desires new connection with opportunity for advancement. B–6574.

CIVIL ENGINEER, Assoc. M. Am. Soc. C. E.; age 38; married. Now satisfactorily filling positions of superintendent of waterworks, commissioner of streets, city engineer, town of 10 000. Fifteen years' experience on design and construction of water-works and sewerage systems, pavements, etc. Desires position with opportunity for advancement. Available on thirty days notice. B–7523-427.

ENGINEER, M. Am. Soc. C. E., desires permanent position; age 39; married. Broad experience in layout, design, construction, and maintenance of complicated industrial plants, including railroad facilities, water supply, industrial waste disposal, power plants, and all plant utilities. Executive experience in construction, organization, and engineering department of large corporation. Prefers position in Chicago or Eastern territory. Now engaged, but available on short notice. B–8882-3.

CIVIL ENGINEER, Assoc. M. Am. Soc. C. E.; age 41; married. Fifteen years' continuous engineering experience in office and field. Extensive railroad construction, including grade reduction work and the preparation of estimates and reports showing the economy of same, also location and maintenance experience. With present employers seven years. Available for responsible position. B–9037.

ENGINEER, M. Am. Soc. C. E.; age 49. Research or experimental work, material handling, labor saving, design, construction, maintenance in all structural materials. C–308.

ARCHITECTURAL ENGINEER, M. Am. Soc. C. E.; technical graduate, University of Illinois; licensed in Illinois, Indiana, and Florida. Fifteen years' experience as building superintendent, structural engineer, draftsman, and general manager of architect's office. Capable of handling any kind of building work. Desires position, preferably in West, but any location considered, with construction company or architect. C-937.

GRADUATE CIVIL ENGINEER, Assoc. M. Am. Soc. C. E.; age 30; married. Three years as construction superintendent on industrial buildings with the installation of chemical equipment therein; three years estimating and foundations. Desires supervising position with consulting engineer or contractor. Salary $315 per month. C-948.

ENGINEER EXECUTIVE, M. Am. Soc. C. E.; technical engineer; age 37. Registered professional engineer having had broad experience in public utilities and general business will be available for employment March 15. Fully qualified for corporate executive work where engineering is also essential. C-956.

CIVIL ENGINEER, M. Am. Soc. C. E.; graduate engineer; registered professional engineer in two States; age 51. Experience in water-power design and construction, ten years; irrigation engineering, seven years; flood control, seven years; municipal work, four years. Prefers investigation and report work, United States or any foreign country. Speaks several languages. C–975.

ASSISTANT PROFESSOR STRUCTURAL ENGINEERING, M. Am. Soc. C. E.; age 40; married; engineering degrees, C. E. and M. C. E. Eight years' practical experience in structural design, and twelve years' experience in teaching. Desires position for next year during Sabbatical leave. C-999.

CIVIL ENGINEER, Assoc. M. Am. Soc. C. E.; university graduate. Thirteen years' experience in flood protection, drainage, highways, hydro-electric construction, railway, track work, design. Prefers position in South. Available on about one month's notice. C–1035.

MUNICIPAL ENGINEER OR CITY MANAGER, Assoc. M. Am. Soc. C. E.; age 40; married. Fifteen years' experience as city engineer in charge of design and construction of street paving, storm and sanitary sewers; sewage disposal, bacteriological tests of sewage; general municipal practice. Available now. Location, Southern New Jersey, or Philadelphia and vicinity. C–1012.

Membership

(From February 3, to March 2, 1926)

Additions

		Date of Membership
ALBER, Harry Conrad Francis. Prin. Asst. Engr., Wm. S. Lozier (Res., 20 Harper St.), Rochester, N. Y.	Assoc. M.	Dec. 14, 1925
ANDERSON, Robert Paul. City Engr. (Res., 4428 Hastings St.), El Paso, Tex.	M.	Jan. 18, 1926
ASBURY, Edward Perris. Engr. in Chg., Shockoe Creek Div., Dept. of Public Works, 2207 Idlewood Ave., Richmond, Va.	Assoc. M.	Jan. 18, 1926
BANTEL, Edward Christian Henry. Prof. of Civ. Eng. and Asst. Dean, Coll. of Eng., Univ. of Texas (Res., 2307 San Antonio St.), Austin, Tex.	Assoc. M. M.	Feb. 4, 1903 Jan. 18, 1926
BLAIR, Homer Orrin. Cons. Engr., Equitable Bldg., Tacoma, Wash.	Assoc. M.	Jan. 18, 1926
BOSWORTH, Harlan Page, Jr. Asst., Eng. Dept., The California Oregon Power Co., Medford, Ore.	Jun.	Jan. 18, 1926
BOWDEN, Edmund Warren. Junior and Asst. Engr., Delaware River Bridge Joint Comm., Philadelphia, Pa. (Res., 105 Oak Terrace, Merchantville, N. J)	Assoc. M.	Jan. 18, 1926
BOWMAN, Waldo Gleason. Editorial Asst., *Engineering News-Record*, 10th Ave. at 36th St. (Res., 47 Gramercy Park), New York, N. Y.	Jun.	Jan. 18, 1926
CARLSTEDT, Harald. Constr. Supt., Carlo Petrillo Co., Inc., Mount Vernon, N. Y. (Res., 132 Dickerson St., Newark, N. J.).	Assoc. M.	Jan. 18, 1926
CLEMMER, Harold Francis. Engr. of Materials, Ill. Div. of Highways (Res., 1900 South Noble Ave.), Springfield, Ill.	Assoc. M. M.	Oct. 2, 1922 Jan. 18, 1926
COOPER, Calvin Macy. County Engr., Crawford County, 508 North Leonard St., Girard, Kans.	Assoc. M.	Dec. 14, 1925
COTTRELL, Frederick William. Engr. Mgr., Deseret Irrig Co., Melville Irrig. Co. and Delta Canal Co., Delta, Utah	Assoc. M. M.	May 31, 1916 Jan. 18, 1926
CRANDALL, Fred Nelson. Reinforcing Steel Detailer, Steel Service Co., 1280 Indiana St., San Francisco (Res., 219 Anita Rd., Burlingame), Calif.	Jun.	Dec. 14, 1925
CUMMINGS, Robert Augustus, Jr. Civ. Engr. (Res., 5911 Elgin Ave.), Pittsburgh, Pa.	Jun. Assoc. M.	Sept. 11, 1917 Dec. 14, 1925
DeBERARD, Wilford Willis. Western Editor, *Engineering News-Record*, 7 South Dearborn St., Chicago, Ill.	Assoc. M. M.	May 2, 1906 Jan. 18, 1926
DEHMEL, Lester Forrest. Care, U. S. Engr. Office, 1604 Keenan Bldg., Pittsburgh, Pa.	Jun.	Dec. 14, 1925
DICKINSON, Thorn. Care, Ulen & Co., Athens, Greece	M.	Dec. 14, 1925
DURRANT, Theodore Vincent Scott. Engadine, Park Hill, Croydon, England	Jun.	Dec. 14, 1925
ECKEL, Clarence Louis. Prof., Civ. Eng., Univ. of Colorado, Boulder, Colo.	Assoc. M. M.	Oct. 11, 1920 Jan. 18, 1926
FISHER, Robert Forrest. County Supt. of Highways, Champaign County, Court House, Urbana, Ill.	Assoc. M.	Dec. 14, 1925
FROST, Maurice Bayard. Care, Gannett, Seelye & Fleming Engrs., Inc., 1 North Market Sq., Harrisburg, Pa.	Jun.	Jan. 18, 1926
GRAHAM, Wallace Edwin. Track Supervisor, B. & O. R. R., 32 Rowland Ave., Mansfield, Ohio	Assoc. M.	Aug. 31, 1925
GREINER, Waldo Karl. 814 Church St., Ann Arbor, Mich.	Jun.	Dec. 14, 1925
GRIMES, John Edward Aloysius. 1 Gowrie Pl., Hawkhill, Dundee, Scotland	Jun.	June 1, 1925
GROSS, Louis Henry. 1345 Plimpton Ave., New York, N. Y.	Jun.	Oct. 12, 1925
GROVE, Russell Sinclair. 701 Limit Ave., St. Louis, Mo.	Jun.	Oct. 12, 1925
GUT, John Jacques. 618 Underwood Bldg., San Francisco, Calif.	Assoc. M.	Jan. 18, 1926
HAENICHEN, Richard, Jr. Appraiser, Sanderson & Porter, 126 Market St., Paterson, N. J.	Assoc. M.	Aug. 31, 1925
HALL, John Wendell. Res. Engr., Hugh L. Cooper & Co., Box 1026, Wilson Dam, Florence, Ala.	Assoc. M. M.	Sept. 9, 1919 Oct. 12, 1925
HASELTINE, Theodore Raymond. Junior Engr., Burns & McDonnell Eng. Co., 402 Interstate Bldg., Kansas City, Mo.	Jun.	Jan. 18, 1926
HEFT, Henry Barton. 238 Lincoln Ave., Council Bluffs, Iowa.	Jun.	Dec. 14, 1925
JERVIS, Charles Miller. Mgr., Compania Central Altagracia S. A., Ingenio Oriente, Oriente, Cuba.	Assoc. M. M.	Mar. 11, 1919 Jan. 18, 1926
JOSEPH, Louis Wyman. Draftsman, Gibbs & Hill, Sound View Ave., Little Neck, N. Y.	Jun.	Dec. 14, 1925
MEIER, Walter Henry. Chf. Engr., Atlantic Oil Producing Co., 710 Magnolia Bldg., Dallas, Tex.	Assoc. M. M.	Dec. 4, 1922 Jan. 18, 1926

MEMBERSHIP—(*Continued*)		Date of Membership.
MEYER, Harry Helmuth. Designing Engr., Sanderson & Porter, 52 William St., New York (Res., 7 Great Oak Lane, Pleasantville), N. Y.	Jun. Assoc. M.	Jan. 17, 1921 Dec. 14, 1925
MORTENSON, Charles Neldon. Junior Topographic Engr., U. S. Geological Survey, Sacramento, Calif.	Jun. Assoc. M.	Mar. 7, 1921 Dec. 14, 1925
PERLITER, Simon. 143 North Kenmore Ave., Los Angeles, Calif.	Jun.	Oct. 12, 1925
REIMANN, John. Special Engr., Valuation Dept., R. F. & P. R. R., Broad St. Station, Richmond, Va.	Assoc. M.	Jan. 18, 1926
ROWE, Perry Arthur. Engr. in Chg., P. A. Rowe & Co., Room 21, Rodesbuilt Arcade, Lake Wales, Fla.	Assoc. M.	Jan. 18, 1926
SCHORER, Herman. 5925 Chabot Rd., Oakland, Calif.	Assoc. M.	Jan. 18, 1926
SHEDD, Thomas Clark, Asst. Prof., Structural Eng., Civ. Eng. Dept., Univ. of Illinois, Urbana, Ill.	Assoc. M. M.	May 28, 1923 Jan. 18, 1926
SLADE, John Rhodes. Project Engr., State Road Dept., Box 255, Lake City, Fla.	Assoc. M. M.	Oct. 8, 1918 Jan. 18, 1926
SPANNE, Peter Lauritzen. Smelter Field Engr., Braden Copper Co., Caletones, Rancagua, Chile.	Assoc. M.	Dec. 14, 1925
TWADDLE, Ralph Harold. Res. Engr. with State Highway Engr., Carson City, Nev.	Jun.	Oct. 12, 1925
VALLE, Juan Agustin. Civ. Engr., Salta 1008, Buenos Aires, Argentine Republic.	Assoc. M.	Aug. 31, 1925
VAN VLIET, Richard. Care, R. E. Horton, Voorheesville, N. Y.	Jun.	Oct. 12, 1925
WINELL, Vern Elwood. Care, W. E. Ward, 1314 Linden Ave., Trinidad, Colo.	Affiliate Assoc. M.	Nov. 21, 1921 Jan. 18, 1926
YOUNG, Herman Stone. 1218 Washtenaw Ave., Ann Arbor, Mich.	Jun	Dec. 14, 1925
ZAPOLSKI, Walter Wadsworth. Civ. Engr., D. E. McIntire, Inc., Boston, Mass. (Res., 17 Gramercy Park, New York, N. Y.)	Jun.	Aug. 31, 1925

Reinstatements

	Date of Reinstatement.
MEMBERS	
KERR, Halbert Stevens	Feb. 16, 1926
KOEPER, Landry Lafayetta	Feb. 16, 1926
SMYTH, Raphael Joseph	Feb. 16, 1926
ASSOCIATE MEMBERS	
HUNTINGTON, Perit Fitch	Jan. 18, 1926
PHILLIPS, Walter Belleville	Mar. 1, 1926
AFFILIATES	
STONE, William Greene	Feb. 16, 1926

Resignations

	Date of Resignation.
MEMBERS	
McCONAGHY, Robert Allen	Feb. 16, 1926
TAYLOR, William Thomas	Feb. 16, 1926
THOMSON, Alexander, Jr.	Feb. 16, 1926
ASSOCIATE MEMBERS	
BERDEAU, Ray William	Feb. 16, 1926
CAMPBELL, Eugene Olyn	Feb. 16, 1926
CAMPBELL, Robert	Feb. 16, 1926
CHANDLER, Jermain	Feb. 16, 1926
DAMON, Henry Hyman	Feb. 16, 1926
JENKS, Harry Neville	Dec. 31, 1925
KELLEY, George Norbert	Feb. 16, 1926
PAHL, William Henry	Feb. 16, 1926
SMITH, Shaler Gordon	Feb. 16, 1926
WADHAMS, Moses Allyn	Feb. 16, 1926
JUNIORS	
RALL, Hans Robert	Feb. 16, 1926
TYLER, Hal B.	Feb. 16, 1926

Deaths

EVERETT, Martin Ryerson. Elected Member, April 14, 1919; died February 3, 1926.
FICKES, Clark Robinson. Elected Member, November 7, 1906; died February 8, 1926.
JOHNSON, Phelps. Elected Member, July 1, 1891; died February 20, 1926.
KOWER, Hermann. Elected Member, October 5, 1904; died February 9, 1926.
McLAIN, Louis Randolph. Elected Member, February 2, 1881; died January 9, 1926.
RIGGS, Morris John. Elected Member, December 6, 1899; died February 7, 1926.
SHAW, Granville Wheaton. Elected Member, October 5, 1887; died January 6, 1925.
WARREN, William Henry. Elected Member, February 5, 1890; died January 9, 1926.
WATANABE, Eitaro. Elected Associate Member, April 5, 1905; date of death unknown.

Total Membership of the Society, March 2, 1926

Members	5 074	
Associate Members	5 265	
Corporate Members		10 339
Honorary Members		15
Juniors		861
Affiliates		151
Fellows		8
Total		11 374